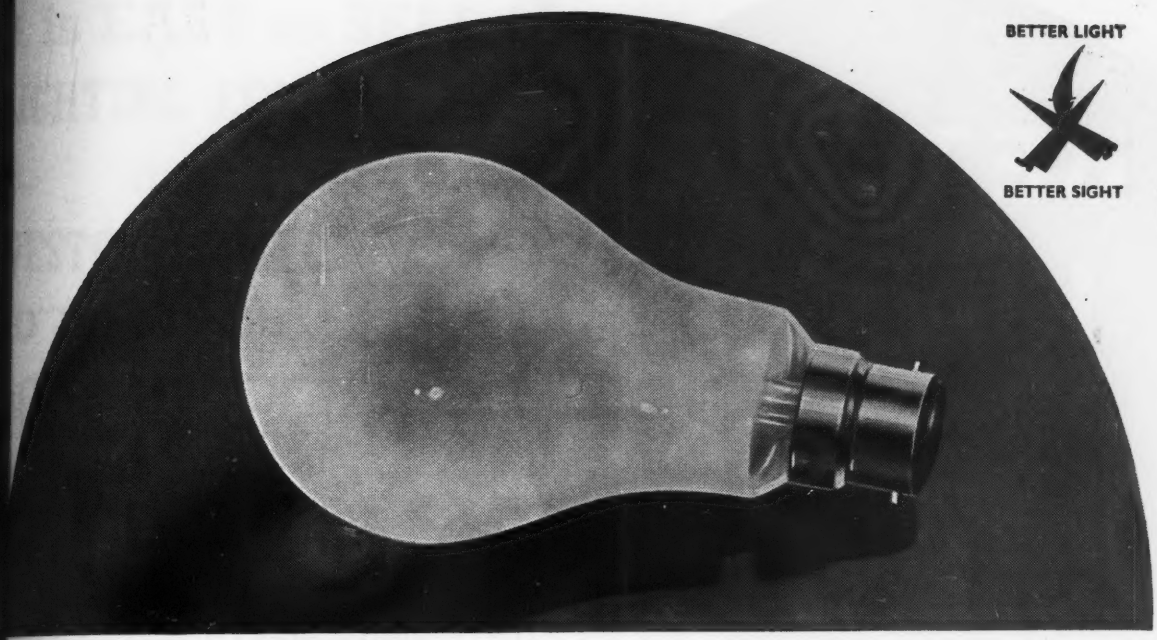
# Light and Lighting

X.—No. 7 July, 1937 Price 9d.



INCORPORATING "THE ILLUMINATING ENGINEER"




# Osram

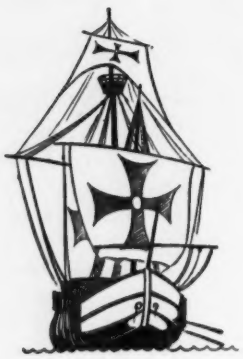
# *the wonderful lamp*

Specify the lamps that are backed by a wonderful reputation—the famous Osram Coiled Coil—and your installation will be right

A G.E.C. PRODUCT

. of The General Electric Co., Ltd., Head Office : Magnet House, Kingsway, London, W.C.2

# COLUMBUS *and* G. V. D.



A story is told concerning Columbus.

Upon his return from discovering the Americas, the younger men of the town were inclined to belittle his achievements.

To set sail and maintain it until another land was seen was so simple!

On one occasion, at a banquet, Columbus had listened patiently.

It was all so simple . . . to which he agreed.

Then, calling for an egg, he invited those around him to stand it upon end.

Numerous efforts were made, but the toppling egg defied the nimblest fingers.

"It can't be done," they said.

By way of reply, Columbus took the egg, tapped the end lightly upon the table, and so this seemingly difficult problem was solved.

Columbus smiled indulgently.

"So simple," he said, ". . . when you know how!"

With all due modesty, we draw a parallel.

The G.V.D. System of Lighting has opened up new territory. Its position is now secure. But there are those who, for fairly obvious reasons, would belittle our achievements.

From "It can't be done," the tune has changed to "It's so simple!"

We cannot resist the temptation to add "So it is . . . when you know how."

Simplification is a mark of progress. Scientifically applied to Lighting it reduces running and maintenance costs, and leads to a better standard of illumination. If you would benefit from the most advanced thinking on this subject, Mr. G. V. Downer will be pleased to co-operate with you. Schemes will gladly be submitted on request. Please address your enquiries to:—

G. V. D. ILLUMINATORS, LTD., ALDWYCH HOUSE, LONDON, W.C.2. HOLBORN 7271

Incorporating "The Illuminating Engineer."

# Light and Lighting

Official Journal of the Illuminating Engineering Society.

32, Victoria St., London, S.W.1

Edited by J. STEWART DOW

Telephone: Victoria 5215

Vol. XXX.—No. 7 **July, 1937** PRICE NINEPENCE
Subscription 10/6 per annum, post free

## Principal Contents:



# The Common Touch

A well-known poem of Kipling's enjoined its hero to keep "the common touch."

This advice may well be marked and learned by those in the lighting industry, where technicalities and perfection are so greatly subject to the influence of the human element. The consumer is indeed the ultimate judge of a lighting installation, in the sense that it is he who foots the bill. It is only when we understand his needs completely that we can solve the lighting problem in which he is interested. In most cases we have to gain his sympathy and to kindle his enthusiasm before we are even allowed to try!

This is particularly true of lighting in the public interest, such as the lighting of our streets. Until the common man is led to understand the nature of good public lighting, to demand it and to signify his willingness to pay for it, local authorities will continue reluctant to dip into the public purse.

Therefore, "keep the common touch." Illuminating engineers should not seek to elevate themselves into a priesthood possessing mysterious knowledge beyond the common ken. "So-called knowledge of lighting," said M. Luckiesh and Frank K. Moss in a recent paper, "is still a tangled maze of beliefs, prejudices, illusions, delusions and known facts"—a hard saying, but with sufficient truth in it to induce humility.


**Association of Public Lighting Engineers' Annual Conference—Public Lighting in Sheffield—Investigations at the National Physical Laboratory—Flashing Lights in Fogs—An Enchanted People's Palace—Polarised Light for Motor-car Headlights.**

## *A.P.L.E. Annual Conference*

We may recall to the minds of our readers the forthcoming Annual Conference of the Association of Public Lighting Engineers, which is this year being held in Folkestone—an agreeable spot—during September 6-9. We note with pleasure that a number of leading members of the Illuminating Engineering Society are contributing to the programme of papers, and we hope that others will manage to be in Folkestone during the period of the conference. The programme is naturally not yet quite in its final state, but we gather that papers on gas lighting by Mr. G. Keith and Mr. Dean Chandler and by Mr. F. C. Smith and K. F. Sawyer are in prospect, and that Mr. G. H. Wilson is again to summarise developments in electric lamps. Dr. S. English and Mr. E. Stroud will describe some experiments in street lighting and an interesting film is to accompany a paper by Mr. R. G. Brandon. As usual the programme is strong on the social side. On the evening of the opening day a reception and dance will be given by the Mayor of Folkestone, who will convey the usual civic welcome to members and delegates on the following morning. On that day there will be a luncheon on the invitation of the Gas Light and Coke Company at the Pavilion Hotel (the headquarters) and the annual banquet and dance will take place on the evening of Wednesday, September 8. Excursions to Canterbury and other places of interest are proposed and we gather that there will, as usual, be demonstrations of special street lighting and floodlighting in the town. Those interested should get in touch with the secretary of the Association (Mr. H. O. Davies, 13, Victoria-street, London, S.W.1).

## *Public Lighting in Sheffield*

The report of the Public Lighting Engineer in Sheffield (Mr. J. F. Colquhoun) as usual contains some interesting figures and records of tests. Although the number of gas lamps in use has diminished slightly the consumption both of gas and electricity has increased somewhat during the past year. Approximately 610 miles of street are now lighted, at an average cost of £102 5s. 0d. per mile per annum. The total candlepower of lamps in use now exceeds three million. The usual graphs at the end of the report show a progressive and steady increase in the c.p. per head of population, though the actual expenditure on lighting is almost exactly the same as it was thirteen years ago. Experiments with automatically controlled lamps (including thirty-one operated by light actuated (Radiovisor) devices) show almost 100 per cent. efficiency of control. Records of tests of the effect of weather conditions on street lamps are presented. In the case of electric lamps, the consumption rises and falls with the burning hours— a natural consequence of the fact that lamps are made to give an average life of 1,000 burning hours—and they are, as might be expected, unaffected by weather conditions. It is perhaps somewhat surprising, however, to find that this last condition also applies to gas mantles, the consumption of which throughout the year remains almost exactly constant. During the year some tests were made to appraise visual safety in main traffic routes, based on observations by motoring members of the Junior Chamber of Commerce. One would like, some time, to hear the results of these experiments!

## *Investigations at the N.P.L.*

Work in progress at the National Physical Laboratory, where the usual annual visit took place on June 22, includes a number of researches of considerable interest to readers. One of the most novel of these utilises an ingenious apparatus for studying whether objects in streets are "picked up" more easily by light of certain colours—a question of great interest in view of the peculiar spectra of sodium and mercury electric discharge lamps. A cinema film of a street scene has been prepared in which objects appear and disappear at different and sometimes unexpected points. This is projected on the screen by light of the character to be examined and arrangements to reproduce brightness of street lights and surroundings correctly are made. The time taken to notice these various objects by different lights is now being studied. Other apparatus of interest includes an automatic daylight factor meter, based on the use of two photo-electric cells, and a new spectrophotometer in which photo-electric methods are also used, with considerable resultant saving in time. In the new Photometry building, which was visited by members of the Illuminating Engineering Society last year, provision has, of course, to be made for a considerable amount of more or less routine photometric testing, besides such special work as that mentioned above.

## *Flashing Lights in Fog*

Some time ago we referred to the ingenious "Sinterae" device with which Mr. L. G. Toplis is experimenting, whereby a flicker is produced by the alternate display of two closely adjacent sources, instead of a single flashing light. Apparently the range of such a device is appreciably greater than that of an ordinary flashing light in foggy weather, though the difference, as might be expected, depends on the distance of observation. At close quarters the difference is stated to be marked, but at a considerable distance the two sources become indistinguishable as separate objects. A difficulty which Mr. Toplis, in common with other experimenters on the range of distant lights, has found, is that the effect of mist and fog is so varied and intermittent. An artificial substitute has accordingly been contrived, the Cooper-Toplis Fog Testing Tank, in which a medium analogous to fog can be prepared.

The imitation of natural mist is not such a simple matter as might be supposed. Mr. Toplis seems to have found that the addition of a small amount of standard milk, free from cream, to water answers the purpose well. Standard conditions in regard to absorption can thus be secured, and the solution diffuses the light without undue selectivity to the red rays. Some solutions otherwise good—for example, water to which a small amount of lubricating oil has been added—resemble pot opal glass in causing sources of light seen through the "mist" to take on a reddish tinge.

With a tank filled with liquid of this description informative experiments can be carried out in quite a small room. It has been found possible thus to demonstrate the apparent greater range of the "Sinterae" light as compared with an ordinary flashing light, and also the fact that if the speed of operation is increased the former is still perceptible as an intermittent light when the effect of flashing from the other source can no longer be seen.

There are a number of points that seem to merit study from the physiological side; for example, the fact that the "Sinterae" vibration is apparently most evident to direct vision, using the central region of the retina, whereas an ordinary flicker usually appears most vivid to oblique vision.

## I.E.S. Visit to Paris

POSTPONED TO SEPTEMBER 17

We learn that the I.E.S. visit to Paris, originally planned for mid-July, has been deferred until Friday, September 17, a date which will afford longer hours of darkness for the inspection of the lighting, and should ensure arrangements in connection with the International Exhibition being more advanced.

Any members and friends wishing to join the party for this week-end visit are requested to send in their names to the Hon. Secretary of the Illuminating Engineering Society, 32, Victoria Street, London, S.W.1.

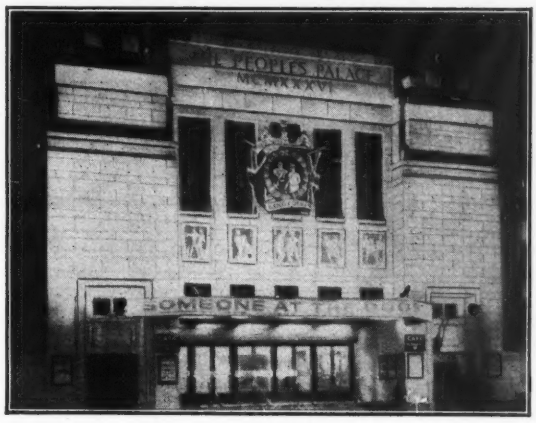
## *Presentation to Mr. T. Catten*

In May last, Glasgow welcomed a return visit from Mr. T. Catten who recently resigned the post of District Engineer to the E.L.M.A. Lighting Service Bureau of Scotland, and the honorary secretaryship of the Glasgow Centre of the Illuminating Engineering Society.

Mr. Catten was presented with a handsome canteen of cutlery by his many and various electrical friends. The meeting was presided over by Mr. J. M. Anderson, and Mr. S. B. Langlands, president of the centre, made the presentation.

A luncheon was given to Mr. Catten at the North British Station Hotel, Glasgow, which was attended by representatives of supply authorities, contractors, and his various friends in the Illuminating Engineering Society throughout Scotland, all of whom wished him every success in his new post with the British Thomson-Houston Co., Ltd.

## *An Enchanted People's Palace*




This pleasing illustration shows the appearance of the new "People's Palace" (London) as floodlighted during the Coronation festivities. For this purpose four Kandem narrow beam projectors equipped with 500 watt lamps were used. Two of the projectors were mounted on the canopy at a distance of six feet from the building and the other two on brackets giving four feet projection.

## *Polarised Light for Motor Headlights*

An interesting study of this question by Mr. L. W. Chubb appears in the Transactions of the American Illuminating Engineering Society for May. Everyone knows the extreme difficulty of devising a headlight which will illuminate the roadway without creating dazzle. The author reviews four "selective" systems based on time, directional action, colour, and polarisation, all of which are successfully used in radio reception. On the highway the first two are scarcely practicable, but selection by colour (e.g. by arranging that cars facing one another use headlights and windscreens equipped respectively with red and green glass) is, at first sight, attractive. The chief difficulty is the adoption of some rigid convention on the roads in order to ensure that a car using a headlight and screen of a certain colour will not, in any circumstances, encounter another one similarly equipped. At first sight the same objection would seem to apply to polarising systems, but the author shows that there is one method, i.e. headlights (and screens) polarised at 45 degrees to the vertical, which seems automatically to give the desired effect. Nevertheless inconsistencies and practical difficulties almost immediately arise. One point is the effect of reflected light which may or may not be depolarised. The author suggests, as an advantage of his system, that not only the direct light from an opposing beam but also specular reflection from the wet surface of a road is gone—but may this not also apply in some degree to the useful brightness created by street lamps? Apart from such difficulties of selection, any substantial degree of polarisation may involve prohibitive loss of light—and yet the system is scarcely worth attempting unless inconvenient dazzle can be not merely diminished but almost completely suppressed.

# Light in Daily Life

## (VII) Light in the Home

"An Englishman's House is His Castle"—Light and Comfort in the Home—Flexibility Essential—Drawing Rooms and Dining Rooms—Central Lights and Brackets—Kitchens, Sculleries and Bathrooms—All-enclosed Lights on Ceilings—Bedroom Lighting—Lighted Mirrors and Special Fittings—Landings and Stairways—Lighting the Porch—Illuminated House Numbers—Ideals in Decoration—The Colour Problem—The Appearance of Flowers by Natural and Artificial Light.

It used to be said that "An Englishman's House is His Castle." It might have been added that it is not infrequently lighted after the manner of a dungeon!

Many of us are old enough to remember well the days when the flat flame gas burner was the usual illuminant in the home, and the slow progress that followed the introduction of the original electric carbon-filament electric lamps. The existence of the relatively efficient modern sources of light, as well as changes in method and outlook, are responsible for the better conditions prevailing to-day.

It was, perhaps, a consequence of the keen competition of the rival illuminants that, in the days of which we speak, so much stress was laid upon the "lighting bill"—so that extreme parsimony in lighting was regarded as a natural thing—however extravagant people might be in other ways.

To-day there is a more just appraisal of the value of light in the home. The comfort it conveys can hardly be exaggerated—and, be it noted, the breadwinner can, for a great part of the year, enjoy it only during the hours of artificial light.

In all departments of the home the fundamental rules of good lighting emphasised in previous articles—sufficient illumination, absence of glare, avoidance of troublesome shadows, should be observed. But beyond this there are endless opportunities for variation and experiment according to the means and taste of the user. There is, indeed, no field in which dogmatism is more out of place. In speaking of the order of illumination necessary, therefore, we should think of processes rather than of rooms. Where good general illumination is needed, in bedrooms (during dressing), in nurseries, bathrooms and kitchen the now widely accepted range of 5 to 10 foot-candles may be advised. For student's homework, for sewing, and where sustained reading is done, higher values, derived from special lighting, may well be provided.

### Flexibility of Lighting.

In the average middle-class home living-rooms may serve various purposes at different times. The lady of the home may be going over her accounts, or the children doing their home lessons; or the room may merely be used for casual conversation by one or two people or may be crowded during a party. For this reason the great advantage of flexibility in the lighting should be stressed. Subdued general lighting by well-screened lamps, supplemented by well-designed table lamps, enable the claims of relaxation and study both to be met, but brilliant general illumination may be desired on festive occasions. Hence the need for ample control of central lights, which should be sub-divided, and the addition of numerous points to which portable reading lamps or standards may be connected.

### The Drawing-room.

In dealing with specific rooms much must be allowed to taste. The usual, and, on the whole, most serviceable, method of achieving the main lighting

of a drawing-room is by means of a central semi-indirect bowl fitting. Some people, however, prefer silk-screened bracket-lights, which often have a charming effect and answer well—provided it is well understood that a room lighted in this subdued way is intended mainly for rest and conversation, and that portable lamps should be available when reading and writing are to be done. Bracket-lights beside the fireplace, whilst forming effective ornaments, are situated in the worst possible positions for people reading round the fire. It is difficult for the light to reach the inclined pages of the book and they read facing the light. On the other hand, light from a central semi-indirect fitting comes over the shoulder. The actual source is not in view and, with light coming mainly by reflection from the ceiling, there is no troublesome shadow.

### The Dining Room.

In the dining room the conventional method is to light the table strongly by means of a central pendant shaded fitting, illuminating the surroundings in a subdued manner, so that the table stands out as the chief feature of interest. This is a natural course during meals, but here again the room may serve other purposes when the meal is cleared away. Therefore supplementary lighting should be possible. Regarding the room as a dining room merely, there are other possibilities according to the taste of the lady of the owner. Where effect and decoration are the main considerations conventional methods may be abandoned. Pleasing effects may be secured with cornice lighting, giving a very subdued general lighting, supplemented by shaded wax candles on the table. (If this idea is followed the writer confesses to a preference for the old wax candle—"electric candles," even when shaded, seem incongruous, and when not shaded an evident sham.)

### Kitchens, Sculleries, and Bathrooms.

But if the dining room may be furnished with subdued lighting on occasion, there should be no mistake about the kitchen where food is prepared. It is a regrettable fact that in houses where much ingenuity and taste have been devoted to the lighting of living rooms, the lighting of the kitchen is often meagre to a degree—perhaps a couple of bulbs in old-fashioned shallow opal shades may be provided. Good service cannot be expected unless there is ample illumination to enable what is being prepared for the table to be seen. In the kitchen, as in the scullery, pantry, and bathroom, pendant fittings should preferably be avoided. There are plenty of excellent all-enclosed modern diffusing fittings, which do not harbour dust and may be mounted direct on the ceiling, flooding the entire room with light and leaving a clear space for operations. In these particular rooms

light-tinted walls and white ceilings are a necessity. In the drawing room, dining room, and study one may, in the interests of decoration utilise darker materials—always bearing in mind, however, that really satisfactory lighting is rendered more difficult by so doing, and that special measures to ensure sufficient well-diffused light must be taken.

### Bedrooms.

The lighting of the bedroom—also apt to be less studied than the living rooms—is really one of the most important problems in the home. After all, one spends a large proportion of one's life in bedrooms. It is there that we prepare to come forth and make a presentable appearance during the day! It used formerly to be said that the main thing to be remembered in lighting a bedroom is to place the lights on either side of the dressing-table and not in the centre of the room. Modern practice, however, is by no means satisfied with this suggestion. The lights on either side of the mirror, illuminating at once the surface of the dressing-table and the face and body of the person using it, are doubtless the most important. But there should be at least two other sources of light, a central unit, giving well-diffused light (preferably either mounted direct on the ceiling or in close proximity to it), and a light at the bedside.

### The Bedside Light.

The bedside light is intended mainly to enable persons to read in comfort in bed, as almost everyone does nowadays. It has also, however, the important function of enabling one to get light at any time during the night without stirring from the bed. One calls it the "bedside" lamp, though in fact, a more convenient method, where a bed-rail exists, is to mount the shaded light on this, so that anyone lying in bed receives the light from above and behind.

In a modern room many variants are possible. The "bedside" lamp, for example, may be replaced by lamps behind panels of diffusing glass, mounted in the structure above the bedhead. Supplementary lighting may also be provided round mirrors in bedrooms, dressing rooms, or bathrooms, by means of a diffusing strip illuminated from behind. It is a little doubtful, however, whether this method, though neat in execution, gives quite the best lighting effect. One is conscious that the illuminated face, as seen in the mirror, is less bright than the surround which furnishes the light, so that really, although strongly lighted, it is apt to appear dark by contrast.

### Landings and Stairways.

In other parts of the house light should not be scrimped. There should be not merely enough, but ample illumination on landings and staircases, and the sources should be well screened so that anything in the nature of glare is absent. Even the coal-cellar should not be without a lighting fitting of simple and robust construction. The lighting of the garage, too, deserves thought, a combination of well diffused general lighting with a substantial portable inspection lamp being advised.

A word may also be said in regard to the lighting of the porch and approaches to the house. Considering how good are modern facilities in the way of lamps and fittings, and the relative cheapness of light to-day, it is really remarkable how often the lighting stops short of the walls of the house and the approaches are neglected. A well-placed luminous panel above the porch may well serve both to reveal the name and number of the house and to shed light on the steps below—enabling the owner of the house both to "speed the parting guest" and, if necessary, to scrutinise night visitors before the door is opened.

### Illuminate the House Number.

The name or number of every house should be clearly visible by night as well as by day. It is poor courtesy to allow the stranger to waste needless time trying to identify a more or less obliterated number by the light of a distant street-lamp. Another device that may well be included in the lighting equipment at the doorway is a miniature spotlight, enabling the drive or stairway to be illuminated for the benefit of the departing guest. How often does one hear the injunction to "mind the step"—without any apparent consciousness of neglect, i.e., that the step ought to be so clearly visible that no caution is necessary! For fittings in the home a wide variety of choice is available, ranging from the panels and plates, etc., built into the walls and ceilings of the ultra-modern interior, to the period fittings essential in homes that still preserve the impression of the antique.

### Ideals in Decoration.

It would take us too far afield to enter into a discussion of the fundamental aims associated with these two methods. By many people dim and obscure surroundings cannot be tolerated. They are all for abundance of light, every corner in the room fully revealed and an intensity of illumination that acts as a cheerful stimulant. Others plead that they get all the stimulant they need during the day and wish their homes to be, above all, "restful." They are therefore inclined to the perpetuation of old styles of furniture and decoration, with the accompanying subdued lighting, as suggesting an escape from modern realities. There is no reason, however, why imitation of an old style should not co-exist with attention to practical requirements. It is still possible to get the desired artistic effect and yet to provide sufficient light for practical purposes, when and where it is really needed. Some care, however, is needed in design and the choice of materials. Coloured silk and parchment, though themselves absorbing a considerable amount of light, can still be used if applied in conjunction with good reflecting surfaces immediately adjacent to the lamp or directive diffusing glassware. Portable table lamps, again, in themselves pleasing objects, can still do good service if well designed. The conventional forms have often defects, notably in using too short a standard, which makes it difficult to secure even illumination. The recently introduced "standard study lamp" is an excellent example of what good design can do, though it does admittedly require a fair amount of space for effective use.

Such developments as the illumination of curtains, the provision of artificial "scenic" windows, illuminated fountains and floodlighting in the garden, hardly come within the scope of domestic lighting as ordinarily understood, though they are all well worthy of study.

### The Colour Problem.

One final point bearing on decoration may, however, be raised—the importance of study of the colour of the light. Whilst the householder does not (as yet) have to study the effects of the unusual spectra of discharge lamps the deviations from daylight in the spectra of electric incandescent filaments or gas mantles is quite sufficient to demand care whenever coloured materials are being arranged or purchased. A lady's evening dress, intended to be worn by artificial light, ought certainly to be inspected by light of this kind as well as by daylight. Flowers intended for table decoraton should be studied in the same way.

The comparative appearance of flowers by daylight and artificial light involves many interesting points and might well form the subject of an article in itself. For the moment it may be said that the hues of many of them undergo remarkable changes when viewed by ordinary artificial light, in which the blue portion of the spectrum is less pronounced than in daylight. Many distinctive blue flowers, such as delphiniums, for example, persist in assuming a mauve hue, whilst chrysanthemums may change from maroon to chocolate-brown or vice versa.

# Colour Correction of Artificial Light

by

A. R. Pearson, M.Sc., LL.B.

When the lights from an incandescent mantle and an electric filament lamp are observed side by side the electric light appears pinkish, while the gas light, owing to its smaller excess of red, is slightly yellow-green. The gas light emphasises the green in blue-greens; the electric light turns yellow to orange and gives a purplish tint to blues. The cause of these effects is shown by the spectral energy curves in Fig. 1. The dotted curve gives the average distribution of energy in the spectrum of direct sunlight as determined at the Smithsonian Institution. The light from a filament lamp of moderate size may be represented by the curve calculated for a black body at 2,800°K, while curve A refers to an ordinary Welsbach mantle, containing about 0.8 per cent. of ceria, operated on low-pressure gas.

### Temperature of Sources.

The most obvious way to "whiten" the artificial lights is to raise the actual temperature of the source. This is easily done (within limits) for the electric filament by increasing the applied voltage, but even a moderate degree of correction by this means shortens the life of the filament to a prohibitive extent. The temperature of the incandescent mantle depends on that of the flame, which is limited by the low primary aeration allowable in low-pressure burners. If the total radiation from the mantle is reduced by lowering its ceria content its temperature approaches more nearly that of the flame and the light becomes whiter. A mantle made on these lines is specified, in British Patent No. 160040/1920, by the South Metropolitan Gas Company and C. J. D. Gair, as containing 0.25 per cent. of ceria and 0.5 per cent. of beryllia. The spectrum of this mantle is shown by curve B in Fig. 1. A considerable degree of correction is obtained.

### Selective Filters.

Beyond these means of correction there remain only the purely subtractive methods of filtration or selective reflection. These methods have long been known and used and are employed in a large number of proprietary modes of construction of units. They must from their nature entail a loss of efficiency, which can be calculated if the properties of the filter or selective reflector are known. For example, a blue glass specially adapted to correct the light of electric filament lamps is described by Chance and Hampton [1]. After filtration through a suitable thickness of this glass the light is a very good approximation to sunlight, but is reduced to about one-third of its initial intensity. (The glass is not suitable for correcting the gas-mantle light, to which it imparts a greenish tint.) The sacrifice of illumination may appear prohibitive, but it must be considered in conjunction with increased suitability for the purpose in hand. If some task involving colour discrimination can be performed easily in corrected light, but in ordinary artificial light with difficulty or not at all, the purely technical efficiency of light production is of minor importance.

(1) Chance and Hampton, Proc. Opt. Convention, 1926, Part I., 37.

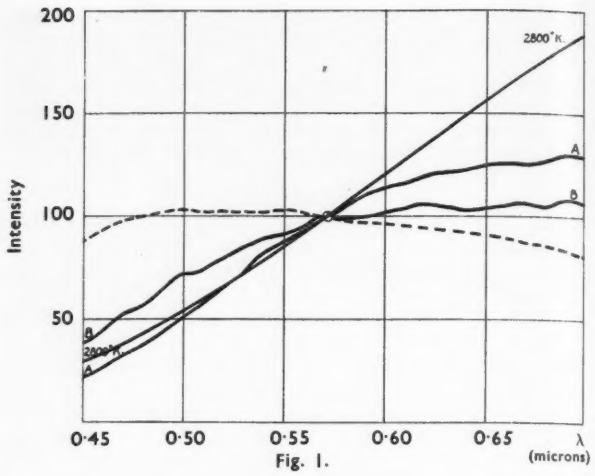



Fig. 1.

### Bulbs of Blue Glass.

In view of the heavy loss entailed by complete correction partially corrected lamps are made with bulbs of blue glass. Spectra of some of these blue bulbs are shown in Fig. 2. Apparently cobalt glass is generally used, for all the tests show the characteristic cobalt absorption bands at 0.51-0.55$\mu$ and 0.59-0.66$\mu$ with a transmission maximum between at about 0.56$\mu$. The depth of tint of the glass, and therewith the degree of correction, vary greatly among different manufacturers. The bulbs tested have therefore been divided into three classes according to their degree of correction,

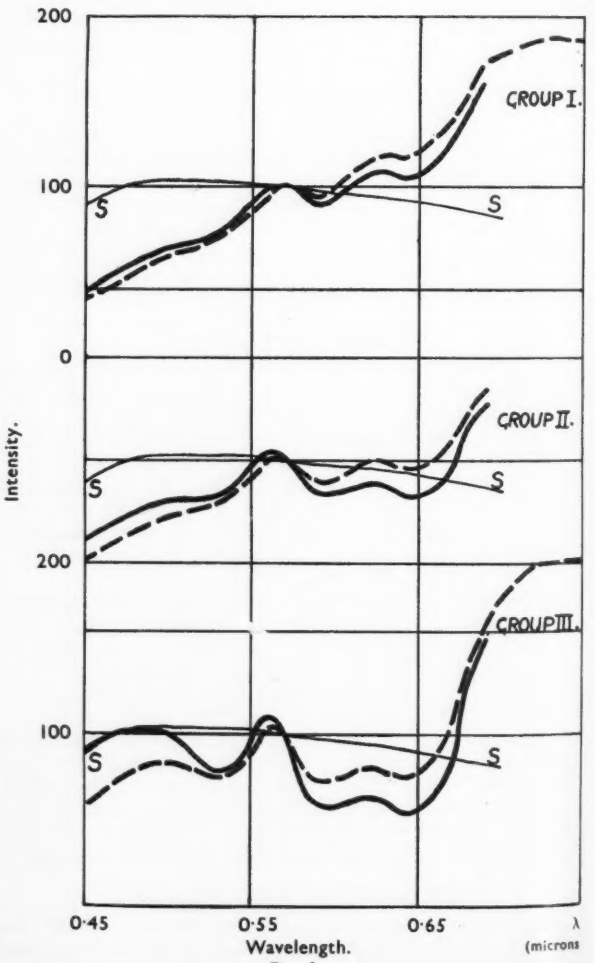



Fig. 2.

and the average for each group is shown in the figure. Lamps of the same make frequently show different amounts of correction according to their size. Generally the correction is greater for small than for large sizes. Also the coloration is never of uniform depth over the whole area of the bulb, so that in all cases the light filtered through the end of the bulb is more corrected than that through the side. The "end-view" and "side-view" spectra are therefore plotted separately for each group. The cobalt bands cause the spectra to diverge widely from that of a full radiator, so that it is useless to attempt correlation with a colour temperature. The distortion of the visually important central region of the spectrum results in a general impression of greenness of the light. Green is exalted and red depressed in the colours of objects, as is readily understood when the spectra are compared with the sunlight curve marked S—S in Fig. 2. In spite of these faults the correction, especially in Groups II. and III., is quite satisfactory for many purposes. The loss of efficiency depends, of course, on the degree of correction. For a medium correction it is about 50 per cent.

### The Low-Ceria "Metro" Mantle.

The low-ceria "Metro" mantle is corrected to an extent which is useful for some purposes, but further correction can usefully be applied by means of reflecting shades coloured a suitable blue. The best tint is an ultramarine or sky-blue of moderate depth. The colour has been prepared in the form of an enamel on dome-shaped iron shades by National Enamels Ltd., and on the inner surface of bell-shaped vitreosil shades by the Thermal Syndicate Ltd. The enamelled domes covered the upper hemisphere down to the level of the bottom of the mantle or thereabouts, and the spectrum of such units is shown in Fig. 3, curve B. It is reasonably smooth and free from deep maxima and minima. It com-

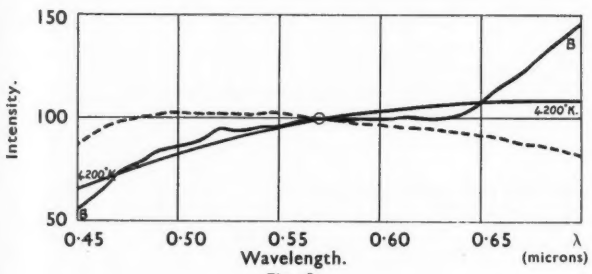


Fig. 3.

pares satisfactorily with that of a black body at 4,200°K. except at the extremes where the visual importance of the radiant energy is small. Although still below the sunlight standard (dotted curve) the blue shade effects a marked improvement in the correction, but necessarily at the cost of some loss of efficiency. The relative positions of the gas units in the latter respect are as follows:—

| | |
|---|---|
| Ordinary Welsbach mantle with white enamelled shade | 100 |
| "Metro" corrected mantle with white enamelled shade | 75 |
| "Metro" mantle with blue enamelled shade | 50 |

The spectra all refer to light received vertically below the unit.

### Corrected Mantle Units.

Blue glass filters can, of course, be applied to gas units, and as the "Metro" mantle is already partly corrected the blue need not be so deep as to make the cobalt bands too conspicuous. Spectra of such units are shown in Fig. 4. The cobalt glass was sprayed on the outside of ordinary cylindro-spherical "globes" of heat-resisting glass. There was diffi-

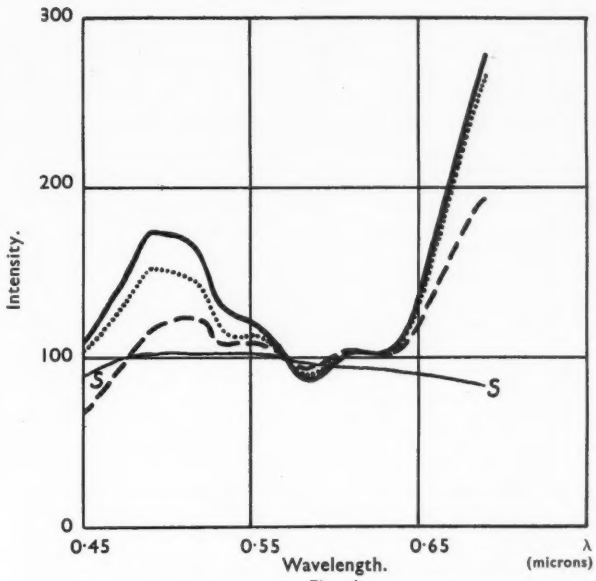
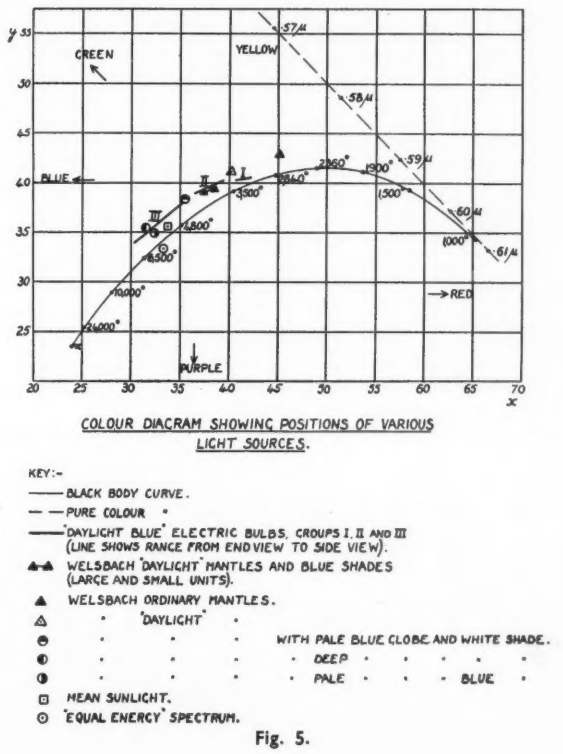


Fig. 4.
Heavy Line indicates deep blue globe and white shade.
Dashed Line indicates pale blue globe and white shade.
Dotted Line indicates pale blue globe and blue shade.
S———S indicates sunlight.



COLOUR DIAGRAM SHOWING POSITIONS OF VARIOUS LIGHT SOURCES.

KEY:-
——— BLACK BODY CURVE.
— — PURE COLOUR "
——— "DAYLIGHT BLUE" ELECTRIC BULBS, GROUPS I, II AND III (LINE SHOWS RANGE FROM END VIEW TO SIDE VIEW).
▲▲ WELSBACH "DAYLIGHT" MANTLES AND BLUE SHADES (LARGE AND SMALL UNITS).
▲ WELSBACH ORDINARY MANTLES.
△ " "DAYLIGHT" "
◓ " " " WITH PALE BLUE GLOBE AND WHITE SHADE.
◐ " " " " DEEP " " " "
◑ " " " " PALE " " " BLUE "
⊡ MEAN SUNLIGHT.
⊙ "EQUAL ENERGY" SPECTRUM.

Fig. 5.

culty in controlling the depth of colour applied, but no doubt this could be surmounted. The effects of deep and pale blue globes are shown in the figure. The best result on the whole was that given by the pale blue globe combined with a blue shade. The light of this combination is slightly greenish, but most coloured fabrics appear very near indeed to their natural tint under this unit, which falls near the sunlight point on the colour diagram. (See Fig. 5.)

### Results on the Colour Diagram.

Fig. 5 is a portion of the colour diagram according to the system adopted by the International Commission on Illumination (²). The continuous curve indicates the colour of a full radiator at any tempera-

(²) Compte Rendu des Séances, 1931, 19.

ture, and the positions of the various units dealt with in this paper are marked. The point corresponding with the spectrum of direct sunlight falls near the 5,000°K point of the black-body curve. The electric filament lamp falls near the 2,800°K point, and the ordinary Welsbach light is just above it. The corrected units then appear successively as one moves towards the sunlight point. First come the lightly-blued bulbs of Group I., indicated by a short line joining the points corresponding with side-view and end-view. These are closely followed by the "Metro" corrected mantle. The electric blue bulbs of Group II. and the units with "Metro" corrected mantles and blue shades are nearly coincident. Finally, nearest the sunlight point come the gas units with blue glass filters and the blue bulbs of Group III. The divergence between the colours of the latter at side-view and at end-view is indicated by the comparatively long line connecting the two points.

It must be observed that the position of a point on this diagram does not fix a particular spectrum to which the point exclusively refers. Thus the approximate coincidence of the Group II. blue bulbs and the blue-shade gas units conceals considerable differences in the forms of the spectral curves. Whereas that of the gas units is smooth (Fig. 3), that of the blue bulbs is deeply sinuous in the visually important middle part of the spectrum. This fact, though not brought out in the colour diagram, is important in assessing the quality of the light. The highly corrected bulbs of Group III., although they approach quite near the sunlight point, may distort certain colours. This is perhaps more clearly brought out by Fig. 6, which shows the spectral luminosity curves calculated from the energy spectra. These curves are a direct measure of the visual sensation produced, and it is clear that while the gas unit follows the sunlight curve fairly well throughout, the cobalt-corrected bulb cannot be brought near coincidence with it.

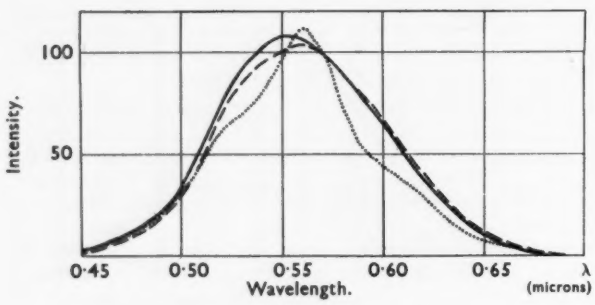



Fig. 6.
Continuous Line indicates mean sunlight.
Dotted Line indicates blue bulb.
Dashed Line indicates corrected mantle and blue shade.

The following table summarises the experimental data discussed above. It gives the spectral energy values of the various units reduced in each case to an arbitrary scale of 100 at wavelength 0.57$\mu$. All values are the results of comparison against a standard acetylene flame ([3]) by means of a Hilger-Nutting spectrophotometer.

A final word of caution may be added concerning the practical utilisation of corrected units. Two facts must be borne in mind. In the first place, people are accustomed to "yellow" artificial light, and invariably describe corrected light as "cold." Secondly, correction involves loss. The use of corrected light cannot therefore be justified except for purposes for which it possesses compensating advantages. There is room for a good deal of investigation in this direction, but it would prolong the article unduly to enter into details of applications. It is sufficient, for the present, to say that cases have occurred in which indiscriminate enthusiasm has brought undeserved discredit on corrected light!

This work was done in the Somerville Laboratory of the South Metropolitan Gas Company, and thanks are due to the Board of Directors of that company for permitting publication. The loyal assistance of Mr. B. Pleasance in the laborious observations is gratefully acknowledged.

(3) Pearson and Pleasance, Proc. Physical Soc., 1935, 47, 1,032.

**SPECTRAL ENERGY-DISTRIBUTION OF ARTIFICIAL LIGHTS.**

| Wavelength (microns) | Incandescent Mantles | | Blue Bulbs | | | | | | "Metro" corrected mantles with supplementary devices | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Group I. | | Group II. | | Group III. | | | | | | |
| | Ordinary | "Metro" corrected | End view | Side view | End view | Side view | End view | Side view | Enamelled blue shade | Vitreosil blue shade | Deep blue globe and white shade | Pale blue globe and white shade | Pale blue globe and blue shade |
| 0.70 | 130.0 | 106.0 | — | 176.7 | — | 148.0 | — | 181.8 | 147.5 | — | — | — | — |
| 0.69 | 131.2 | 108.5 | 160.6 | 169.9 | 132.5 | 142.3 | 156.4 | 163.6 | 140.3 | 153.2 | 279.7 | 194.1 | 267.5 |
| 0.68 | 128.1 | 104.3 | 149.3 | 158.0 | 123.2 | 132.3 | 133.3 | 139.4 | 131.7 | 145.4 | 250.5 | 182.3 | 240.8 |
| 0.67 | 125.8 | 105.7 | 128.0 | 140.7 | 96.9 | 113.1 | 84.4 | 105.6 | 122.8 | 132.3 | 211.6 | 161.4 | 201.4 |
| 0.66 | 126.4 | 104.8 | 116.0 | 129.6 | 85.7 | 102.2 | 65.1 | 87.8 | 117.0 | 121.8 | 173.9 | 144.3 | 165.7 |
| 0.65 | 125.9 | 103.7 | 107.8 | 120.5 | 79.9 | 95.6 | 56.7 | 77.6 | 107.4 | 112.5 | 136.9 | 121.6 | 131.8 |
| 0.64 | 122.3 | 102.8 | 105.5 | 116.3 | 79.5 | 94.6 | 55.8 | 74.9 | 102.6 | 109.2 | 113.3 | 106.8 | 110.4 |
| 0.63 | 122.2 | 104.2 | 108.5 | 118.4 | 84.2 | 99.0 | 61.8 | 79.2 | 100.3 | 106.3 | 104.2 | 102.2 | 102.8 |
| 0.62 | 120.4 | 105.5 | 106.4 | 115.4 | 85.5 | 98.8 | 63.7 | 80.3 | 101.1 | 105.8 | 104.2 | 104.3 | 103.8 |
| 0.61 | 116.8 | 103.6 | 100.4 | 108.2 | 83.3 | 94.9 | 61.4 | 77.6 | 100.1 | 104.8 | 102.9 | 104.9 | 103.3 |
| 0.60 | 114.7 | 101.6 | 93.5 | 99.7 | 80.4 | 89.6 | 58.7 | 72.4 | 100.1 | 104.0 | 96.7 | 101.5 | 98.8 |
| 0.59 | 110.5 | 100.0 | 89.0 | 93.9 | 79.7 | 86.7 | 59.7 | 72.3 | 99.0 | 105.5 | 88.5 | 95.5 | 91.6 |
| 0.58 | 104.7 | 98.2 | 94.2 | 97.4 | 88.3 | 92.4 | 75.6 | 83.1 | 98.1 | 103.0 | 88.4 | 94.1 | 91.2 |
| 0.57 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0.56 | 93.6 | 96.0 | 99.3 | 96.0 | 105.5 | 100.6 | 110.8 | 103.1 | 99.3 | 97.5 | 114.4 | 107.3 | 110.4 |
| 0.55 | 88.0 | 91.5 | 90.2 | 85.4 | 98.2 | 91.0 | 96.4 | 89.7 | 96.0 | 97.1 | 122.1 | 108.8 | 114.2 |
| 0.54 | 82.1 | 90.1 | 80.5 | 78.2 | 87.9 | 83.7 | 81.5 | 78.2 | 95.6 | 94.2 | 122.6 | 103.9 | 111.7 |
| 0.53 | 72.4 | 85.1 | 73.1 | 71.0 | 79.1 | 75.6 | 78.4 | 75.7 | 94.1 | 92.8 | 133.4 | 108.0 | 119.3 |
| 0.52 | 65.1 | 80.7 | 69.9 | 66.5 | 77.3 | 72.3 | 86.0 | 78.6 | 95.2 | 91.4 | 160.8 | 123.5 | 142.0 |
| 0.51 | 58.0 | 74.7 | 66.7 | 63.1 | 75.8 | 68.9 | 93.4 | 80.2 | 89.6 | 89.2 | 169.9 | 123.4 | 148.4 |
| 0.50 | 51.9 | 72.3 | 65.3 | 60.7 | 76.6 | 67.4 | 100.5 | 83.5 | 86.8 | 86.4 | 173.4 | 120.0 | 150.7 |
| 0.49 | 44.3 | 65.3 | 60.5 | 55.1 | 72.9 | 62.7 | 101.4 | 81.6 | 84.8 | 82.6 | 174.6 | 116.1 | 152.5 |
| 0.48 | 38.2 | 57.2 | 55.6 | 49.7 | 69.3 | 58.2 | 101.7 | 78.2 | 78.1 | 76.0 | 157.9 | 103.1 | 139.1 |
| 0.47 | 33.1 | 53.3 | 50.6 | 44.7 | 65.1 | 53.4 | 100.7 | 72.7 | 73.2 | 70.7 | 141.6 | 91.4 | 127.1 |
| 0.46 | 26.7 | 45.1 | 44.0 | 39.2 | 58.4 | 47.1 | 95.0 | 63.7 | 63.8 | 60.9 | 125.1 | 79.8 | 115.0 |
| 0.45 | 22.5 | 38.3 | 39.2 | 35.9 | 53.8 | 42.7 | 92.1 | 57.4 | 56.1 | 53.4 | 109.0 | 68.8 | 104.1 |

# New Street Lighting at Cambridge

—o—

We are pleased to record that Cambridge has completed an extensive scheme of improved street lighting.

At the request of the Corporation of Cambridge, specimen installations were erected by the Cambridge University and Town Gas Light Company in Sidney-street, Gonville-place, and St. Andrew's-street.

Following the official inspection by the Corporation, tests were carried out by the staff of the National Physical Laboratory which proved that Class E lighting was obtained. It was decided to adopt this standard, arranging the units as in the specimen installations, and to proceed with the scheme for all main streets.

Erection of the new standards was commenced in May, 1936, and the scheme is nearly completed, upwards of 900 units of the new type having been erected, covering 22 miles of main streets. The lamps which were chosen and standardised for the improvements are Sugg's 6 Light No. 2 "Rochester" Suspension pattern, fitted with Holophane Dish Refractor No. 2/4401 and "P" type directional wings of rustless steel. They are mounted on steel columns with "Wask" suspension gear to facilitate maintenance, and spaced at 40 yards. There is an overhang of 6 feet from the kerbline and the height from the road level to mantles is 18 feet.

As mentioned above, the illumination conforms fully to Class E, British Standard Specification. In fact, the N.P.L. tests showed a margin of 25 per cent. in hand over and above the Class E requirement of 0.1 horizontal foot-candles. The improvement may be summarised in the statement that 680 old lamps averaging about 100 candle power each have been replaced by over 900 lamps of 600 candle power each, plus directional lighting.

The lighting is stated to be remarkably uniform and free from dazzle, and Cambridge may be congratulated on this advance. The whole scheme has been carried through by Mr. G. W. Teasdale, P.A.S.I., M.Inst.M. & Cy.E., Borough Engineer and Surveyor, in collaboration with the late Mr. H. Shewring, former Engineer and Manager to the Cambridge University and Town Gas Light Company, and his successor, Mr. J. Hunter Rioch, M.Inst.Gas E.

## Traffic Control at Blackfriars

The control of traffic on the series of roads converging at Blackfriars (London), where between 8 a.m. and 7 p.m. vehicles pass at an average of 3,000-4,000 per hour, has lately been receiving detailed study by the Ministry of Transport. The scheme now being completed is a large and intricate one, with 35 standards in all. Three different methods of control (vehicle actuated, pedestrian actuated, and vehicle actuated with extra faces for the guidance of pedestrians) are incorporated in the system. "Cross Now" signals in yellow, alternating with the usual red danger signal will be used at pedestrian crossings. (We learn that the "Don't Cross" signal is to be discontinued.)

SOME EXAMPLES OF GAS LIGHTING IN CAMBRIDGE ROADS.

Lighting in this old university town is of a somewhat special nature. Not only are there narrow main streets, which often carry dense traffic, to be considered, but also many roads of a residential character and some—such as those in the famous "backs"—overshadowed in summer by the foliage of trees.

# Literature on Lighting

## (Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

*(Continued from Page 155, June, 1937)*

### II.—PHOTOMETRY.

**172. Fundamental Theories in Photometry.**

*J. Dourgnon.* R.G.E., Vol. 41, No. 20, pp. 619-633, May 15, 1937.

After defining and discussing various photometric quantities, an elementary account is given of a rectorial representation method. Geometrical photometric analysis, the conservation of luminous flux, and initial brightness are dealt with in detail W. R. S.

**173. Apparatus for Measuring Reflection Values.**

*Anon.* El. World, 107, p. 1, 584, May 8, 1937.

The article gives a description of a simple piece of apparatus for obtaining quantitative data on the reflection charateristics of various surface finishes. The results are only comparative, but a standard sample may be kept for reference. S. S. B.

**174. Light Cell Reflectometer.**

*Anon.* Am. Illum. Eng. Soc. Trans., 5, p. 470, May, 1937.

Describes a portable reflectometer, which can be placed against the material under test, and gives a direct reading of the reflection factor of the surface. The instrument can be adapted to measure the transmission factor of translucent materials. J. S. S.

### III.—SOURCES OF LIGHT.

**175. British Standard Specification for Tungsten Filament General Service Lamps No. 161. 1937. Revised June, 1937.**

This is the eighth revision of this very useful specification, which now includes nearly forty pages of matter. There are six sections, entitled respectively Definitions, General Procedure, Requirements, Selection of Lamps for Test, Conditions of Test, and Reflection, two schedules relating respectively to single-coil and coiled coil lamps, and certain explanatory matter in appendices. Attention is drawn to the departure whereby the average value of light-output is now defined as the value after 500 hours' operation. J. S. D.

**176. New 1,000-watt Bi-post Base Lamp.**

*Anon.* Elect. Engineering, 56, p. 550, May, 1937.

A description is given of a new 1,000-watt filament lamp, equipped with a bipost base and an inside frosted tubular bulb. Several advantages are claimed for the new lamp. S. S. B.

**177. Discharge Lamps**

*Anon.* Elect., 118, p. 769, June 4, 1937.

A brief description is given of the use of ultra violet radiation for stage purposes at a London theatre. C. A. M.

### IV.—LIGHTING EQUIPMENT.

**178. Lighting Fittings.**

*A. B. Read.* El. Times, 91, pp. 625-626, May 6, 1937.

The relation between artistic and technical requirements in a fitting are discussed. The effect of the 1925 Paris Exhibition is considered, and also future tendencies. W. R. S.

**179. Luminescence and its Applications.**

*J. T. Randall.* G.E.C. Journal, VIII., No. 2, pp. 103-115, May, 1937.

A detailed study is given of the present-day applications of luminescent powders in discharge tubes and cathode ray tubes. Numerous spectra are given. C. A. M.

**180. Intelligent Lamp Service.**

*R. N. Falge.* Am. Illum. Eng. Soc. Trans., 5, pp. 544-566, May, 1937.

The essentials of good vehicle lighting are set out, and the present system in America is described. The necessity of co-operation between manufacturer, service agent, and user is emphasised. J. S. S.

### V.—APPLICATIONS OF LIGHT.

**181. Light and Architecture.**

*L. H. Graves.* Am. Illum. Eng. Soc. Trans., 5, pp. 472-482, May, 1937.

Summarises the activities of the American Illum. Eng. Society in connection with architecture. Some photographs of representative schemes are given. J. S. S.

**182. Report on Lighting in the Candy Manufacturing Industry.**

*Committee on Industrial Lighting.* Am. Illum. Eng. Soc. Trans., 5, pp. 483-504, May, 1937.

The type of lighting best suited for the different processes of chocolate and sweet manufacture is treated in detail. J. S. S.

**183. A New Approach to the Industrial Lighting Problem. Specific Lighting for Different Services.**

*H. B. Dates.* Elect. Engineering, 56, p. 545, May, 1937.

Comprehensive surveys have shown the general inadequacy of artificial lighting in industry. The rapid increase of scientific knowledge on the relation of light and seeing has opened a new approach to the specification of lighting for industrial processes, involving critical studies of the visual tasks, and the quality and quantity of the illumination needed. Results of the application of this new method are described in the paper. S. S. B.

**184. Colliery Illumination.**

*J. W. Howell.* El. Rev., Vol. CXX., No. 3,104, p. 757, May 21, 1937.

Recommends equipment for different aspects of colliery lighting, including coal face equipment. Photographs of some installations are given, and values of illumination suggested. R. G. H.

**185. Reduce Eye Strain for Jewel Inspection.**

*P. C. Pogue.* El. World, 107, p. 1,582, May 8, 1937.

The author describes the application of an 85-watt H.P.M.V. lamp to microscope illumination for the inspection of meter jewels. S. S. B.

**186. Industrial Floodlighting.**

*S. Anderson.* G.E.C. Journal, VIII., No. 2, pp. 148-159, May, 1937.

Examples are given with numerous photographs of various industrial floodlighting problems and their solutions. C. A. M.

**187. Stage Lighting in Paris.**

*Anon.* El. Rev., Vol. CXX., No. 3,104. p. 764, May 21, 1937.

A description of the control equipment for the new 1,800 KVA stage-lighting installation of the Paris Opera House. R. G. H.

**188. Lighting of the Brussels-Anvers Road.**

*J. Chanteux.* R.G.E., Vol. 41, No. 20, pp. 635-639, May 15, 1937.

The route between Brussels and Anvers has been relit, using in some places sodium and in others mercury-vapour lamps. The fittings have a cut-off at 75°. Photographs and details of the installations are given. W. R. S.

**189. Lighting of Two Highways Outside Grenoble.**

*Anon.* R.G.E., Vol. 41, No. 22, pp. 709-710, May 29, 1937.

A photograph and description of the apparatus used in a sodium vapour lamp installation at Grenoble. 100-watt centrally-suspended cut-off fittings are used. W. R. S.

**190. Application of Sodium Light to the Highway.**

*George A. Eddy.* El. World, 107, p. 1,394, April 24, 1937.

The author states points to be observed for most effective application of sodium lighting units for highway lighting. Details of the circuits and recommended positioning of the units are given. S. S. B.

**191. Improved Lighting in Atlanta.**

*Anon.* Light, VI., No. 5, p. 20 and p. 44, May, 1937.

An unusual method of lighting a clothing store is described. Luminous trough built-up fittings are used and are glazed with a special colour correcting glass for colour discrimination. C. A. M.

**192. Tests of Lighting the Place de la Concorde (Paris).**

*R. Pagès.* Lux, 10, No. 4, pp. 58-60, April, 1937.

Describes, with illustrations, comparative tests of the existing system of lighting by means of multitude of candelabra, equipped with gas mantles and situated at a low level, and a new method comprising a much smaller number of electric units on high masts. J. S. D.

**193. British Standard Specification for Land Aerodrome and Airway Lighting B No. 563. 1937. Revised June, 1937.**

This important specification, after defining about thirty terms used in connection with the subject, presents three parts devoted to land aerodrome lighting, airway lighting, and lighting for air navigation. Beacons, boundary lights, obstruction lights, landing area floodlights, illumination direction indicators, etc., are all defined with precision. The colours used in aviation and the spacing of airway beasons are dealt with in appendices. J. S. D.

**194. Floodlighting in France.**

*Anon.* Elect., 118, pp. 667-668, May 21, 1937.

Five mobile units with generating and floodlighting equipment have been developed to tour the smaller towns of France during the present summer and early autumn. C. A. M.

**195. Lighting of a French Historical Building.**

*Anon.* El. Times, 91, p. 626, May 6, 1937.

Photographs and details of the floodlighting at the Loge de Mer, Perpignan. Tungsten filament lamps are used. W. R. S.

**196. Coronation Floodlighting.**

*Anon.* El. Times, 91, pp. 623-624, May 6, 1937; El. Times, 91, pp. 655-657, May 13, 1937.

Gives photographs and descriptions of floodlighting installations in London and in Scotland. W. R. S.

**197. Coronation Illumination.**

*Anon.* El. Times, 91, pp. 691-692, May 20, 1937; El. Times, 91, pp. 719-720, May 27, 1937.

A further selection of photographs with descriptions of important floodlighting installations. W. R. S.

**198. The Paris Exhibition.**

*J. Mosebach.* El. Times, 91, p. 685, May 20, 1937.

Devoted chiefly to discussing the illuminated fountains in the Seine. W. R. S.

**199. Paris Exposition of 1937.**

*Anon.* Light, VI., No. 5, pp. 29-31, May, 1937.

A description is given with photographs of some lighting effects at the Paris Exhibition. Telescopic standards, each carrying a 1,500 watt lamp, extending to 30 metres high by night and 2 metres high by day, have been experimented with in the Place de la Concorde. C. A. M.

**200. Californian Novelties.**

*Anon.* Elect., 118, p. 669, May 21, 1937.

It is proposed to use near-ultra violet radiation in floodlighting lagoons at the Golden Gate International Exposition of 1939. C. A. M.

**201. Polarised Light for Motor Vehicle Lighting.**

*L. W. Chubb.* Am. Illum. Eng. Soc. Trans., 5, pp. 505-543, May, 1937.

Methods of selective lighting by means of polarised light are described, and the preferable method, using polarisation at 45 degrees, is fully covered. The system is compared with that now in existence, and an appendix deals with the quantitative treatment of factors introduced by polarisation. J. S. S.

---

# Illuminating Engineering Society

## Formation of North Midland Area Local Centre

For some years there has been a local centre of the Illuminating Engineering Society with headquarters in Manchester, and quite recently similar centres have been started in Glasgow and Dublin.

We hear that the formation of a local section for the North Midland Area, with headquarters in Leeds, is now being energetically taken up and that an encouraging influx of members has already been secured. A strong committee, on which both gas and electrical interests are well represented, has been formed and is fortunate in having secured as chairman Councillor H. Wadsworth Sellers, who is very well known locally. An attractive programme of meetings for next session, including such subjects as the lighting of streets and textile works, decorative lighting, etc., is being prepared and local visits are being arranged.

The honorary secretary is Mr. J. W. Howell (10, Apson-chambers, 68, Albion-street, Leeds), whose recent paper on the lighting of mines will be recalled, and who has done excellent work in connection with the newly formed Industrial Lighting Section in London. All readers in the Yorkshire area interested in illumination should get in touch with Mr. Howell forthwith.

# Recent Patents

*(Abstracts of recent Patents on Illumination & Photometry.)*

**No. 463,499. "Improvements in Cover Glasses for Signalling and Floodlighting Projectors."**

*Corning Glass Works. Dated February* 4, 1935. *(Convention, U.S.A.)*

This specification describes a cover glass for projectors having, distributed over its face in a series of rows, light-deflecting members each consisting of a section of a torus. One side of each light-deflecting member which projects from the surface is toroidal and the other side is cylindrical, and is at right angles to the surface of the cover glass. Both sides intersect in a curved line, which is approximately parallel to the surface of the cover glass. The toric surface of each light-deflecting member may be convex.

**No. 463,755. "Improvements in or Related to Combinations of Electric Discharge Devices and Luminescent Materials."**

*The General Electric Company, Limited (Communicated by Patent-Treuhand Gesellschaft für Elektrische Glühlampen m.b.H.). February*, 14, 1936.

A lamp for producing yellow light comprises, according to this specification, a discharge tube emitting the low-pressure mercury spectrum, a material adapted, when excited by the discharge, to emit red or orange light, such as cadmium silicate, and a yellow filter through which both the light of the discharge and that of the luminescent material pass. The filter may be constituted by a yellow glass envelope.

**No. 463,803. "Improvements in Electric Lamps."**

*The General Electric Company, Limited (Communicated by Patent-Treuhand Gesellschaft für Elektrische Glühlampen m.b.H.). October* 22, 1935.

This specification describes a lamp of the kind in which luminescent material contained in an evacuated envelope is excited by electronic bombardment from a cathode having a tubular envelope of which the length is at least twice the diameter. The luminescent material extends over the greater part of the length of the envelope and substantially all round its circumference. The cathode extends also along the greater part of the length, and auxiliary electrodes may be provided to distribute the electrons from the cathode. Two anodes may be provided for use with alternating current.

**No. 463,887. "Improvements Relating to Gas Lamps."**

*Sandeman, D. G., and Kemp, A. S. January* 22, 1936.

This specification describes a gas lighting unit for streets, etc., having an automatic ignition device, a pneumatically-operated valve adapted to cut off the gas supply to the burner, a forced primary air supply to the burner and a by-pass from the forced air supply to the pneumatic chamber of the gas valve. the forced air supply is provided by a generator driven by an electric motor controlled by a switch. When the motor is started up, the gas valve is opened and the lamp is lit; and when the motor is stopped the gas valve is closed.

**No. 463,918. "Improvements in Illuminating Installations, more Particularly for Flying Grounds."**

*N. V. Philips Gloelampenfabrieken. August* 7, 1935. *(Convention, Germany.)*

According to this specification an illuminating installation for a flying ground, etc., has a multi-part cover for a space containing a light source, the parts of the cover being normally individually biassed to an open position, but, being temporarily moved downwards by external force (as of impact by aircraft), so that the light is partly or wholly interrupted. The cover parts may form reflectors and may be pivoted upon a common shaft. The arrangement may be sunk in the ground.

**No. 463,921. "Improvements in or Relating to Headlights and Light Projectors for Vehicles."**

*Boinet, J. September* 4, 1936.

This specification describes a head lamp with a single filament bulb in which there are disposed in front of the bulb and reflector a series of fixed shutters or louvres, which are diffusing on their upper surfaces and reflecting on their lower surfaces, and a series of semi-transparent pivoted shutters respectively between the fixed shutters.

**No. 463,994. "Process and Apparatus for Utilising and Measuring Variations of Illumination."**

*Chilowsky, C. January* 5, 1935. *(Convention, Germany.)*

A photometric relay, according to this specification, operates by virtue of change of pressure or of volume consequent upon change of equilibrium between the rate of recombination by photo-chemical action of gases and a constant rate of electrolytic production of such gases. In particular, hydrochloric acid is electrolised by a constant, but adjustable, direct current to produce hydrogen and chlorine in a U-tube closed by a mercury column. The hydrogen and chlorine recombine at a rate which depends upon the light to which they are subjected.

**No. 464,870. "Improved Reflector Lamps for the Illumination of Long and Narrow Surfaces."**

*Zeiss Ikon Aktiengesellschaft. November* 2, 1934. *(Convention, Germany.)*

This specification describes a lamp having two light sources disposed near the ends of a long parabolic cylinder. The ends of the cylinder are each provided with two or more paraboloidal reflectors of which the axes of generation make different angles with the axis of the cylinder, but such that all the rays reflected from one light source by the reflectors at its end clear the lower edges of the reflectors at the other end.

**No. 465,089. "Improvements in Electric Incandescent Lamps."**

*The General Electric Company, Limited. August* 12, 1935. *(Convention, Germany.)*

In order to avoid blackening of the envelope of heavily loaded tungsten filament lamps, a body which is adapted to release oxygen when heated, for example, a solid solution of an oxide in an insulating oxide, such as alumina, magnesia, lime, or beryllia, is, according to this specification, disposed within the lamp envelope and connected as a resistance in series with the filament.

# More Coronation Floodlighting

In what follows we give a few additional examples of Coronation floodlighting, which we were unable to include in the general account in our last issue (June, pp. 157-174). The very representative series of views then presented served to show how widely distributed efforts have been. From all parts of the country reports of interesting installations come to hand.

### Floodlighting in Trafalgar-square.

We are indebted to the Edison Swan Electric Co., Ltd., for the two pictures reproduced below, showing floodlighting effects in Trafalgar-square (London). The view of the National Gallery shows how artificial

A view of the National Gallery, London, floodlighted during the Coronation festivities.

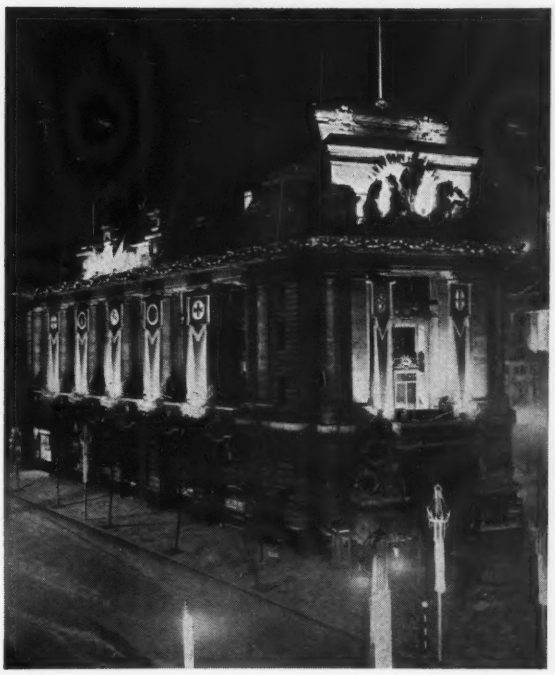
lighting can be used to cause certain architectural features, such as the pillars in the middle of this picture, to stand out more evidently than in the daytime. Where buildings are furnished with tall pillars, and there is adequate space behind, it is usually the most

Floodlighting of the fountains in Trafalgar-square (London).

effective plan to install concealed lights behind them, thus furnishing a bright background.

The second view shows the lighting of the fountains in Trafalgar-square—a spot where crowds always assemble on occasions of national rejoicing.

### Australia House.



Australia House (Strand, London), which was floodlighted on the Strand and Aldwych faces. For this purpose 14 "Manton" floodlights, each equipped with two 500-watt Siemens gasfilled lamps, and nine "Luton" floodlights, each equipped with one 500-watt lamp, were used.

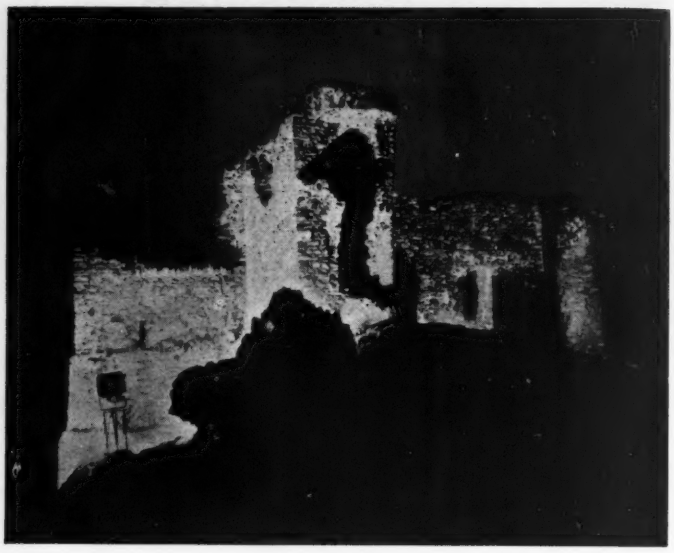
### A War Memorial.

This picture is typical of many war memorials throughout the country, which, as a rule, make good subjects for floodlighting. The fact that a tall and

The War Memorial, Hampstead, another Holophane installation.

slender spire has usually to be lighted, instead of a wide expanse of surface, does, however, necessitate a somewhat narrow beam and careful choice of equipment.

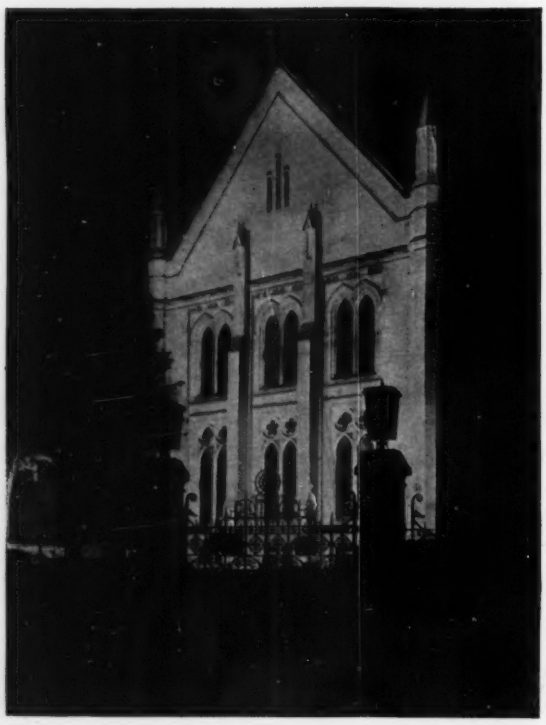
The Portcullis of Warwick Castle.



Kendal Castle.

## Some Further Examples of Coronation Floodlighting with Gas

We illustrate a few additional examples of Coronation floodlighting with gas, of which many good instances occurred in the provinces. The two pictures above, the portcullis of Warwick Castle and Kendal Castle, illustrate the treatment of ancient buildings, whilst the two below show effects with more modern buildings in Nottingham. In the case of Kendal Castle ten gas lamps of 10,000 c.p. each were employed. Similar lamps were also used for the Kendal Parish Church, and this seems to have proved a popular form of unit. Multiple-mantle units lend themselves well to such cases as these where concentration of light in a narrow beam is not necessary and the diffusion of light from a number of sources is often an advantage.



Nottingham Public Library.

Wollaton Park Gateway, Nottingham.

A view showing the Johannesburg City Hall, and one of the twelve triumphal arches, illuminated by colour sprayed lamps and neon tubing.

The City Hall, Cape Town: a very effective piece of floodlighting, with the foliage of tropical plants in the garden silhouetted against the bright background.

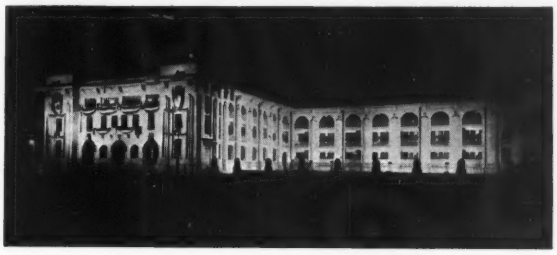
# Coronation Overseas Floodlighting

By the courtesy of the General Electric Co., Ltd., we present on this page views of a number of outstanding installations of Coronation floodlighting in the British Colonies and Dominions.

A feature in most cases is the combination of electric discharge (Osira) and filament (Osram) lamps. Even in distant lands colour is coming to play a dominant part in floodlighting effects. The lighting of the City Hall, Cape Town, appears to be a particularly effective installation, and illustrates one advantage often found overseas—the fact that the building stands in its own spacious grounds, so that a clear view may be had from several different directions.

This advantage of a clear aspect is again enjoyed by the Fullerton Building, Singapore, viewed from across the water, in which effective use of contrast is made.

It will be recalled that at the meeting of the Illuminating Engineering Society in May some account of similar installations in New Zealand was given, and there must be many other instances known to our readers. The Coronation festivities have been the means of illustrating how steadily lighting overseas is progressing. The results do credit to the enterprise of local public works departments and contractors, as well as affording evidence of a growing recognition of the possibilities of decorative lighting and of a corresponding willingness to face necessary expenditure in this form on special occasions.



The Detective Station, Robinson Road, Singapore. Illumination was provided by six floodlights with 1,000-watt filament lamps, five with 400-watt electric discharge lamps, and three with red Osira tubes.

Fullerton Building, Singapore. The road in the foreground was festooned with 15-watt red, white and blue lamps. For the building itself, 37 floodlights with projector lamps, and 42 special trough type units, each equipped with two 200-watt lamps (31 with orange colour screens), were used. A few special supplementary floodlights were also installed.

The Standard Bank of South Africa, Pretoria, illuminated by floodlights, equipped with electric discharge lamps furnishing red, white and amber light. Supplementary illumination for the upper cornice was provided by special troughing using 200 100-watt blue colour sprayed lamps.

# Lighting the Coronation Robes

The above picture shows the appearance of the main showcase in the Exhibition of Coronation Robes at the Royal School of Needlework, South Kensington. Nearest the camera are the robes of the Master of the Horse, the Duke of Beaufort, K.G., and those of his page, whilst the robes of the Lord Chamberlain, the Earl of Cromer, are seen on the left. The appearance of the display is much enhanced by artificial light, and the concealed lighting, arranged by Holophane Ltd., shows the robes to advantage.

## Hay's Wharf, London

We are indebted to Kandem Electrical Ltd. for the above illustration showing the floodlighting, during the Coronation festivities, of Hay's Wharf, London. The equipment consisted of 14 1,000-watt long range projectors mounted seven on either side of the building on the jetties, at a distance of approximately 20 feet.

## The Town Hall, Birmingham

The above picture, furnished by Siemens Electric Lamps and Supplies Ltd., shows the floodlighting of the Town Hall, Birmingham, by 400-watt Sieray electric discharge lamps, installed by the City of Birmingham Electric Supply Dept. This is another case of pillars being effectively shown in silhouette.

## Some Stirring Relics of English History

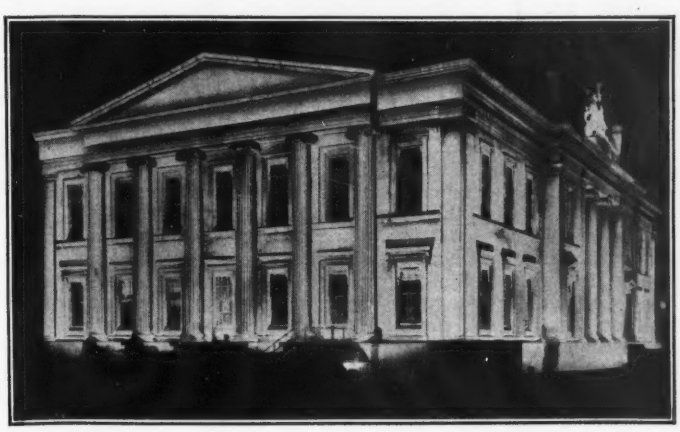
In our last issue we mentioned briefly a most unusual Coronation memento received from Philips Lamps, Ltd., an album bearing the above title. In the execution of the cover and frontispiece the appearance of age has been skilfully rendered, both in regard to type and paper. On subsequent pages there are facsimiles (in which the impression of age is again most successfully given) of various documents associated with memorable episodes of the past which are to be found in the British Museum, the Royal Library at Windsor Castle, and the Public Record Office. Amongst them are the letter from Lady Jane Grey announcing her accession to the throne of England, Sir Philip Sidney's last letter, and letters from Nelson and Wellington written on the eves of the battles of Trafalgar and Waterloo.

## A Coronation Brochure

A pleasing Coronation souvenir, intended mainly for distribution to children, has reached us from the British Electrical Development Association. In this the development of artificial lighting from the days of primitive cavemen up to the floodlighting of the present day are pictorially represented in colour. Included amongst the pictures are an Elizabethan street scene, an eighteenth-century drawing-room, and Sir Humphry Davy demonstrating the first electric light, whilst the final views show the illumination of Westminster Abbey, St. James's Park, Hampton Court Palace, etc., during the Coronation period. Final pictures illustrate the modern marvels of television and listening-in.

## Floodlighting the Fishmonger's Hall

We are indebted to Kandem Electrical, Ltd., for the accompanying picture showing the floodlighting of the Fishmongers' Hall (London). A feature of interest is that the lighting of this building was carried out entirely by means of long range projectors, mounted at ground level, at an average projection-distance of eight feet. In spite of the fact that the surface of the building was considerably blackened, it stood out in a striking manner by night. The sculptured Coat of Arms seen at the top of the building was illuminated by means of two narrow beam projectors on three-foot brackets, and fitted with 250 watt projector lamps. The total load was 17.5 kw.



## Coronation Lighting at Haifa

Floodlighting during the recent Coronation festivities was certainly very widespread. On a previous page we give some examples of installations in the British Dominions. We have also received from one of our correspondents in the East, Mr. O. Lauterbach, the accompanying pictures of floodlighting at Haifa, Palestine. The first of these shows the illumination by night of a tomb in the vicinity (the tomb of the daughter of Abbas Effendi, Leader of the Persian religious sect); the other two show respectively the offices of the Municipal Corporation of Haifa and the headquarters of the Irak Petroleum Company floodlighted. In sending us these examples of local enterprise, Mr. Lauterbach explains that the benefits of modern methods of lighting are naturally not yet widely recognised in Palestine; nevertheless, the subject is now exciting interest and continually receiving more attention.

Fig. 1. The Tomb of the Daughter of Abbas Eff. (Leader of the Persian religious sect.)

Fig. 2. The offices of the Municipal Corporation of Haifa.

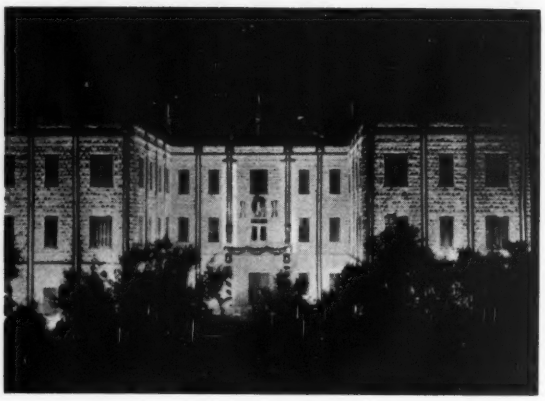
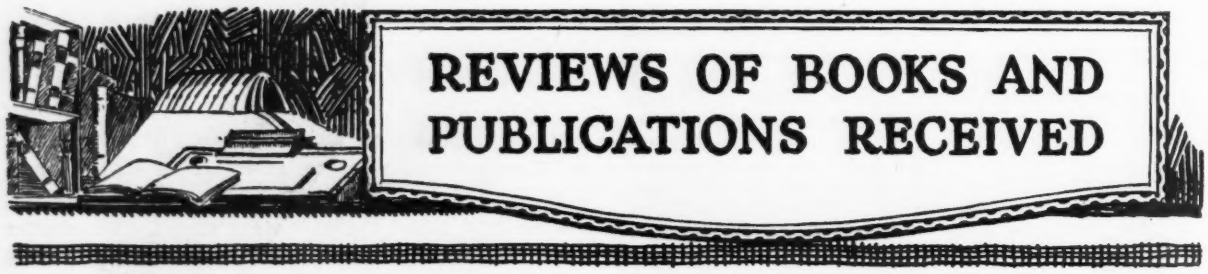


Fig. 3. Headquarters of the Iraq Petroleum Co.




*Recommandations, Officielles de la Commission Internationale de l'Eclairage. (Neuvième Session, 1935); Reorganisation des Comites d'Etudes. (Cambridge University Press, 1937; pp. 28.)*

It may be recalled that, after the conclusion of the session of the International Commission on Illumination in Germany in 1935, we published a general account of the proceedings,* in which some of the chief recommendations were quoted. The official (French) version (issued primarily for the information of members and delegates) has now been published. The booklet contains, firstly, a summary of proposals and recommendations made at the various sessions, and, secondly, outlines of the future work of the various committees. The range of topics (nomenclature definition and symbols, glare, motor-car headlights, lighting of schools, streets, factories, and mines, coloured signal glasses, daylight, shadows, etc.) is extraordinarily varied. In the case of aviation lighting the recommendations are most detailed and specific. One would like wider publicity to be given to any similar official summaries of the work of future international conferences.

* Illum. Eng. Sept., 1935; pp. 283-291.

*Public Library Lighting; Vol. I. Natural Lighting. By R. D. Hilton Smith. (Alex. J. Philip, Gravesend, 1937; pp. 68.)*

We hold the view that the ideas of the enlightened user of light are well worth having. Mr. R. D. Hilton Smith, as the Borough Librarian for Deptford, has a professional knowledge of library requirements, and he also shows himself conversant with current literature on illumination. He has produced a readable little book free almost completely from technicalities, but containing much sound and simple advice. The necessity for compromise between ideal lighting conditions and other desirable ones is illustrated. (How many illuminating engineers, under the head of "planning for light," would think to include a section on "Amiability"?) The chapters deal with general principles and planning, light and interior decoration, top lighting, side lighting, and—perhaps the most useful one—improving bad conditions. At the end is a brief list of libraries at home and abroad, where interesting aspects of natural lighting are to be seen.

# ELECTRIC street lighting

## Recent progress

The following lighting will *NOW* be Electric :—

| | |
|---|---|
| * Billingham-on-Tees | 736 lamps |
| * Chelmsford | The Whole Town |
| * Cullen | The Whole Town |
| * Deptford | 50 miles |
| Derby | 387 lamps |
| * Dufftown | The Whole Town |
| Eccles | £1,000 |
| Halifax | 50 lamps |
| * Hornsey | 61 miles, £40,000 |
| * Ilminster | The Whole Town |
| Islington | 240 lamps |
| Lambeth | 1,032 lamps |
| Letchworth | Hitchin and Baldock Roads |
| Marlow | The Whole Town |
| Newton-in-Makerfield | 2½ miles of main road |
| Scarborough | 3 important streets |
| * Stanstead | The Whole Town |
| Stoke Newington | 52 lamps |
| Walsall | Lichfield Street |
| * Yarm | The Whole Town |

** Street lighting in this town will be all-electric on completion of present scheme*


**ELECTRIC STREET LIGHTING ECONOMICALLY MEETS THE REQUIREMENTS OF THE INTERIM REPORT AND PROVIDES MAXIMUM VISIBILITY**

*Birmingham is erecting 150 new electric lighting columns a week*

ISSUED BY THE BRITISH ELECTRICAL ASSOCIATION, 2 SAVOY HILL, LONDON, W.C.2

# Modern Hotel Lighting

## Reconstruction of the Grand Hotel, Sheffield.

*(Architects: Hadfield and Cawkwell, F./A.R.I.B.A.)*

Reconstruction of a modern hotel is usually accompanied by a complete redesign of the lighting arrangements which are adapted to suit the new style of decoration. An immense amount can be done to reduce the labour of running an hotel to a minimum. Walls and ceilings may be finished in tones which assist the diffusion of light, retain their natural colours, and remain clean for a maximum period. All decorations and excrescences which tend to harbour dirt and dust can be rigorously suppressed. Generally speaking, all these tendencies in modern decoration tend to help the illumination. Modern lighting fittings have the same qualities of simplicity and absence of unnecessary embellishment.

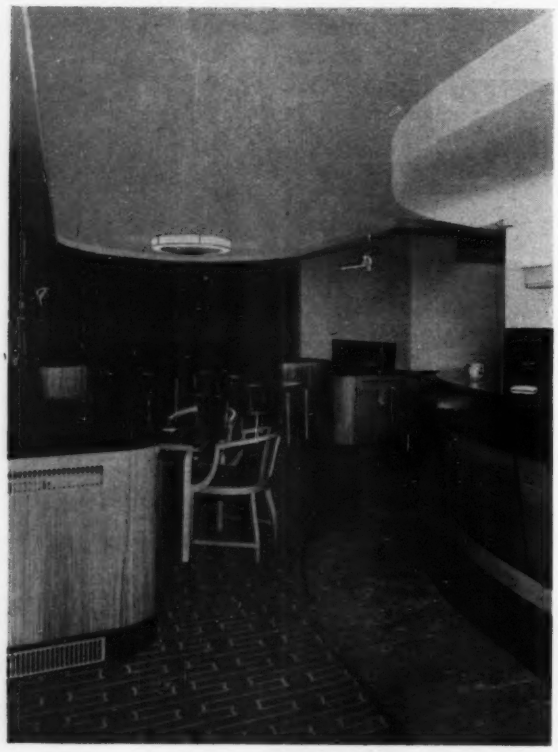


Fig. 3. A view of the Cocktail Bar with interesting form of ceiling unit embodying ventilation grille.

A good example of modern methods, in the lighting of a reconstructed hotel, is afforded by the Grand Hotel, Sheffield.

The original restaurant had a coffered ceiling with pendant lighting fittings. In the reconstructed restaurant, illustrated in Figs. 1 and 2, simplicity is the main note. Air conditioning is provided. The room is effectively furnished and excellently lighted.

The cornice lighting shown in these two pictures incorporates 40-watt lamps at intervals of 3 feet. It is something of a feat to allow such an interval without uneven brightness being produced. The result is a tribute to skill in design and to the ample cornice provided by the architects, which was designed to meet the requirements of the lighting. The alcoves are illuminated by means of panels let into the ceiling. In the centre of the room is a large laylight (not switched on when these photographs were taken) which, besides providing general illumination, also incorporates spot-lights enabling coloured light to be projected on to dancers or cabaret below. A system of colour changing is provided, and any desired effect can be obtained without affecting the main lighting from the laylight—a somewhat unusual condition to be achieved by such simple means.

Fig. 1. A view of the reconstructed restaurant, showing effective cornice lighting.

As the pictures suggest, the installation meets well the main requirements of modern lighting, absence of glare, combined with satisfactory diffusion of light.

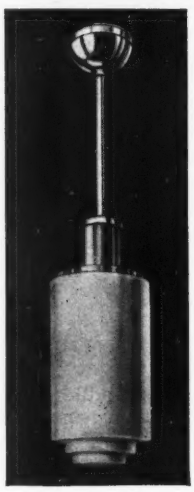
The same conditions are to be found in the cocktail bar illustrated in Fig. 3. This is illuminated by means of G.V.D. wall boxes, artificial windows, and a circular ceiling unit. The latter unit, which is 3 ft. 9 in. in diameter, is of special interest. In spite of the fact that it embodies the ventilation grille, which protrudes through the centre of the unit, even distribution of light was obtained with only four lamps.

We are indebted for the above information and the accompanying illustrations to G.V.D. Illuminators, Ltd., who were responsible for the whole of the lighting.

Fig. 2. Another view of the restaurant showing large central laylight of special design.


## Fittings for Electric Discharge Lamps

It is remarkable how quickly appropriate fittings for electric discharge lamps have made their appearance, so that something for almost every field of work is now available. This is illustrated in a recent list issued by Benjamin Electric, Ltd., from which the two accompanying illustrations are taken. On the left is the Bencolite (Type "N") unit which gives a soft diffusing effect and is well suited for locations where strong side lighting is needed. We also show the "Saaflux" Glassteel Diffuser adapted to discharge lamps in a very simple form. This retains the useful quality of allowing some light to emerge upwards and thus prevents the upper part of the room appearing too dark.

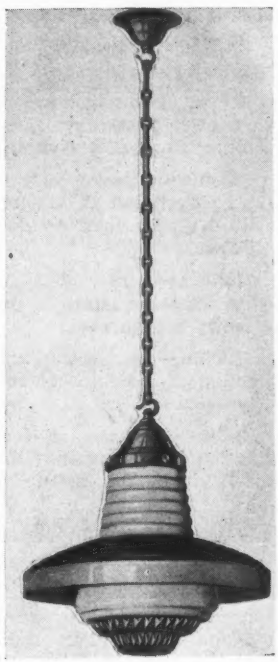


The Bencolite (Type "N") Unit.

"Saaflux" Glassteel Diffuser.

## "Lumenic" Lighting Unit

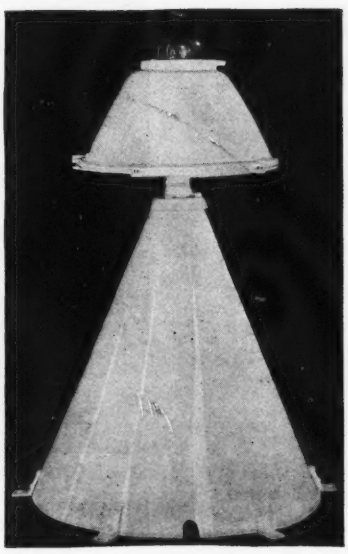
Here is illustrated a type of lighting unit recently introduced by Siemens Electric Lamps and Supplies, Ltd., which is of somewhat unusual appearance. This three-piece reflector unit consists of a 3-ply opal glass globe with a silvered glass outer reflector and a removable satin-finish crystal prismatic-bottom cup. The standard distance from ceiling plate to bottom of glassware is thirty-six inches. It is stated that the unit furnishes approximately two and a half times more illumination on the horizontal working plane than does the ordinary type of enclosed unit. It is therefore useful when a more definite downward concentration of light is desirable (when, for example, not very much assistance in the form of reflection from upper parts of walls and ceilings can be expected).



## Illuminated Channel Buoys for Seaplanes

The Government of Singapore has placed an order with the General Electric Company, Ltd., for a number of illuminated buoys for the Seaplane Channel in Singapore Harbour. At night the whole of this channel will be marked by means of these buoys, situated about 100 yards apart, so that seaplanes and flying boats will have a clearly defined passage when taxi-ing for taking-off or alighting.

The equipment, here illustrated, consists of a special reflector mounted above a straight-sided sheet metal cone. Projecting slightly above the reflector is a small amber-domed glass fitted with an E.S. lamp-holder which accommodates a 6.6-volt 6.6-amp. lamp. This lamp provides illumination to the domed amber top, and to the inside of the special reflector so that the light is suffused over the sides of the metal cone below. The whole fitting is mounted centrally on top of an 8-ft. diameter concrete buoy. The cone referred to houses an isolating transformer in a water-tight cast-iron base.



The primary windings of the transformers in all the buoys comprising the complete installation are connected by a single core cable in series, but the failure of any one lamp does not interfere with any other of the lamps in circuit.

## A Building Centre for Scotland

At a meeting recently held at the Rankine Hall, Glasgow, a resolution in favour of the establishment of a Building Centre in Scotland was approved. Lord Elgin, in his opening address, testified to the usefulness of the Building Centre in London, of which Mr. Yerbury gave a general description. It was mentioned that in the year just terminated 68,776 visitors had attended and 97,000 technical inquiries had been dealt with. It was believed that a centre in Scotland would prove equally useful.

## Electric Street Lighting

*Ashington* (Northumberland).—The lighting comprises nearly 1,000 filament lamps. Recent improvements include the adoption of greater mounting heights, and the substitution of modern reflectors, etc. Electric discharge lighting on main roads is being considered and trials of mercury-sodium and dual type (mercury-filament) lamps are being made.

*Blackburn.*—In collaboration with the Gas and Electrical Engineers the Borough Engineer is to report in regard to the provision of electric street lighting throughout the Borough.

*Bournemouth.*—£12,000 is to be spent on improved lighting during the next two years, being part of a comprehensive ten years' scheme. Numerous installations of mercury lamps are projected.

*Brighton.*—As a result of a trial installation in the Dyke Road the whole distance from Seven Dials to the Railway Station is now lighted by modern methods, in line with those on the London Road. 300-watt lamps in pairs are erected on span wires supported by transport poles.

*Cullen.*—Electric street lighting, at an annual cost of £227, is now to be provided.

*Dufftown.*—Previously lit by paraffin lamps, initiates a scheme of electric street lighting in the autumn.

*Eccles.*—Permission has been received from the Electricity Committee to borrow £2,388 for the extension of discharge lighting along Liverpool and Worsley roads.

*Finsbury* (London).—In the interests of safety the children's playground at Bartholomew-square has been equipped with 400-watt mercury discharge lamps, mounted in pairs on 25-ft. columns.

*Halifax.*—A new installation of thirty-four 400-watt mercury discharge lamps, a permanent Coronation effort, was recently inaugurated.

*Hitchin.*—An expenditure of £450 on the experimental lighting of a stretch of road by sodium lamps has been approved.

*Ilford.*—Provision of electric discharge lamps on trolley-bus routes has involved the placing of orders to the value of £5,274 by the Borough Electrical Engineer.

*Islington.*—£2,000 is to be expended on further improvements involving 240 additional electric lamps.

*Newcastle-on-Tyne.*—Beacons at 171 pedestrian crossings are to be lighted by electricity at a cost of £989, the annual maintenance cost being £176.

*Paignton.*—150-watt sodium discharge lamps are being installed between Primley and Tweenway.

*Portslade.*—The tender of the Brighton Lighting and Electrical Engineering Company for the installation of 103 lamps in Portslade has been accepted by Brighton Council.

*Preston.*—Following successful results with the original installations of dual type (filament-discharge) lamps, the Corporation is to extend the system with some hundreds of 300- and 500-watt lamps.

*Stansted.*—A tender of £232 for seventy-five 100-watt lamps by the North Metropolitan Electric Supply Company has been accepted, and a total annual expenditure up to £300, to allow for further extensions and improvements, was sanctioned.

## Illuminating Engineering Society

### OPENING MEETING

The Opening Meeting of the next session of the Illuminating Engineering Society will be held on Tuesday, October 12, 1937, when there will be the usual display of apparatus illustrating progress in illuminating engineering.

Preparations for the programme are already being initiated. Any members' suggestions in regard to novelties of outstanding interest will be welcomed by the Honorary Secretary.

## Floodlighting Warkworth Castle

A striking effect was produced in floodlighting the ancient Warkworth Castle in Northumberland. The North-Eastern Electric Supply Company illuminated the body of the building by the golden light of "Philora" sodium electric discharge lamps, whilst the tower was illuminated by the greenish light of mercury lamps. The unusual combination was the subject of much comment by many road users and railway passengers.

## B.T.-H. at the Royal Tournament


A floodlighted model of the Tower of London forms the central feature of the B.T.-H. display at the Royal Tournament. It is flanked by cut-out photographs, also lighted, of the Admiralty Arch and Horse Guards.

# Obituary

### Robert Beveridge

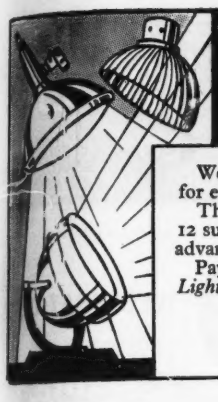
It is with great regret that we record the death, on June 12, of Mr. Robert Beveridge, who was President of the Association of Public Lighting Engineers in 1931-32, and was well known to many of those interested in street lighting. About two years ago he retired from the position of public lighting superintendent in Edinburgh, and was then elected an honorary member of the Association. To a wider circle Mr. Beveridge became known when, in 1931, he shared in the organisation of the gathering of the International Illumination Congress in Edinburgh, where a session dealing with public lighting was held. Mr. Beveridge quickly gained the esteem and affection of those with whom he came in contact. His somewhat quiet but observant manner was united with a courteous and kindly disposition, a well-stored mind, and a certain originality of outlook, which made him an interesting companion. The funeral service at Warriston Crematorium on June 15 was attended by many of his brother officials and councillors and employees who had served under him.

## Crown of Work for President of the International Optical League

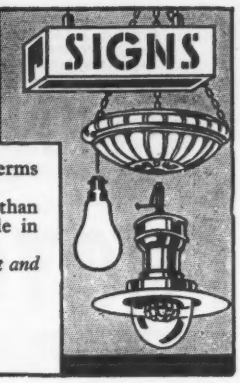
The Olympic Crown of Work, which was initiated by the Belgian Government in 1930, was awarded to Mr. John Hamer Sutcliffe, O.B.E., F.Inst.P., in the presence of the President and Councillors of the Municipal Council and the British Ambassador in Paris at the Hotel de Ville, on the occasion of the meeting of the International Optical League, of which Mr. Sutcliffe is President. He is Registrar of the Joint Council of Qualified Opticians, the body which co-operated with the electrical industry in the Better Light—Better Sight campaign last year.

## Reconstruction of the E.L.M.A. Lighting Service Bureau

We learn that the main demonstration room and the architectural lighting studio at the E.L.M.A. Lighting Service Bureau are now in course of reconstruction in readiness for the autumn. Much new demonstration equipment is being added, and with the inauguration of these new rooms in September the bureau will be found to be equipped better than ever to deal with its varied problems. In the meantime, the usual service of the bureau is in no way interrupted, and those rooms which are not under reconstruction are available for inspection.



# ·WHERE TO BUY·
## A DIRECTORY OF LIGHTING EQUIPMENT




We invite applications for spaces in this new section of the journal. Particulars of terms for each space (approx. 1 inch deep and 3½ inches wide) are given below.

These terms are equivalent to **half our ordinary advertising rates**, but not less than 12 successive monthly insertions can be accepted on this basis, and amounts are payable in advance.

Payment for an advertisement in this section entitles the advertiser to receive *Light and Lighting* during the period of the contract.

| Terms: | | | | | |
|---|---|---|---|---|---|
| 12 Successive Monthly Insertions | £3 10 0 | Payable |
| 24 " " " | £6 0 0 | in |
| 36 " " " | £8 10 0 | Advance |

1

MODERN LIGHTING FITTINGS
*New Catalogue on application*
Fittings manufactured to Architects' Specifications
**ASCOG LIMITED**
Ascog House, 44, Theobalds Road, LONDON, W.C.1

2

**PHOTOMETRIC EQUIPMENT** for technical, lighting, and scientific research
**ALEXANDER WRIGHT & CO., LTD.,**
**WESTMINSTER, S.W.1**

3

ALLOM BROTHERS LTD.
16, GROSVENOR PLACE, LONDON, S.W.1.
*Specialists in the Science of Modern Lighting, including:*
Theatres and Public Halls. Tennis and Racquet Courts.
Pictures and Picture Galleries. Floodlighting, etc.
Decorative Fittings in Glass and Metal.

4

*Take no risks— specify* **BENJAMIN PLANNED LIGHTING**
THE BENJAMIN ELECTRIC, Ltd., TARIFF ROAD, N.17

5

MAZDA LAMPS and B T H LIGHTING EQUIPMENT
*Our Illuminating Engineers will be pleased to advise you on any street or floodlighting problem*
THE BRITISH THOMSON-HOUSTON CO., LTD., Crown House, Aldwych, W.C.2

6

**BROMFORD**
**Seamless Steel Lighting Standards**
*for all requirements*
BROMFORD TUBE CO., LTD., ASTON, BIRMINGHAM

7

THE REINFORCED CONCRETE LAMP COLUMNS SPECIALISTS.
**CONCRETE UTILITIES, Ltd.**
**WARE, Herts.**

8

**CRYSTAL CHANDELIERS**
AND
**SILVERED GLASS REFLECTORS**
— DIRECT IMPORTERS —
*PLEASE WRITE FOR CATALOGUE AND TERMS:*
CRYSTAL & INDUSTRIAL FITTINGS Co., 72 Shoe Lane, Fleet Street, E.C.4.
Telephone: CENTRAL 7340

9

Curtis Lighting
COMPANY OF GREAT BRITAIN LIMITED
OFFICES: ALDWYCH HOUSE LONDON W.C.2
WORKS: PONDERS END MIDDLESEX
*Manufacturers of* **X-Ray Reflectors**

10

**DAWSON REFLECTORS**
**Indoor and Outdoor Floodlights**
JENA REFLECTOR FITTINGS
**Miss E. H. DAWSON & HENCKEL,**
**42, Gray's Inn Rd., London, W.C.1**
*Telephone: Chancery 7751/2*

11

Specialists in
ARCHITECTURAL ILLUMINATION AND DESIGNS
DRAKE & GORHAM LTD.
36, GROSVENOR GARDENS, LONDON, S.W.1
Manchester, Glasgow, Hereford and Winchester.

12

**TYPERLITE** LOCAL LIGHTING UNITS ADAPTABLE TO ALL PURPOSES & SITUATIONS
Sole Proprietors and Patentees
**ELECTRICITY SERVICES LTD.**
*ASK FOR CATALOGUE.*
86, Cannon St., LONDON, E.C.4
Mansion House 5294 (3 Lines)

13

**"ESLA"**
**BI-MULTI AND MULTIPLANE REFLECTORS**
Lanterns, Brackets, Columns, Switches and Fuse Boxes, etc., FOR STREET LIGHTING
**The Electric Street Lighting Apparatus Co.**
**The Foundry, Canterbury**

14

**VITREOUS ENAMELLING**
**(CAST IRON & M. S. SHEET)**
Cooker parts, stripped & re-enamelled. Reflectors, Lanterns, etc., for industrial & Public Lighting.
**ELM WORKS Ltd., Summerstown, S.W.17. Est. 1903.**

## Index to "Where to Buy"



*N.B.—The numbers are those attached to individual entries in the Directory (See pp. 211-213).*

## Public Lighting with Gas

The report of the Belfast Corporation Gas Department discloses the fact that in the year ended March 31 400 million cubic feet of gas were used for public lighting. Most of the main thoroughfares of the city are lighted by low pressure cluster type gas lamps which are stated to have proved most effective.

The local gas department has secured the contract for lighting an additional 42 miles of Dewsbury's main road. The new lighting is to be of Class "E" standard.

Among recent contracts for street lighting with gas in rural areas, are agreements affecting Southgate (7 years), Smeeton Westerby, Great Boughton (a nine-year contract), Willington (seven years), Dawlish (also a seven-year agreement), Knottingley (five years), and Tipperary. Other recent contracts relate to Rugeley, Bawtry, Willenhall, and Todmorden.

The general purposes committee of St. Ives (Hunts), Town Council has recommended the acceptance of a street lighting tender from the local gas undertaking for a period of five years. The cost of £400 per annum is to include the lighting and maintenance of 115 street lamps.

A 15-year contract for the gas lighting of the new Promenade Road on Canvey Island, where some of the roads are already lighted by gas, has recently been concluded. This is the eighth 15-year street lighting contract gained in the last five years by the Gas Light and Coke Company.

A ten-year contract for street lighting by gas has been entered into by the Haslemere Urban District Council. The number of lamps involved—about 300—will be increased and various other improvements are designed to bring the lighting of the district up to a generous Class "F" standard.

The municipal housing scheme at Hill Street, Kirkcaldy, is to have a system of street lighting consisting of fifty-six five-light gas lamps. The cost of the installation is estimated at £800.

## Catalogues and Advertising Literature

**We invite all firms in the Lighting Industry to send us new catalogues as they appear, for reference in these columns**

BRITISH THOMSON-HOUSTON CO., LTD.—Catalogue of Mazda Projector Lamps suitable for cinema and lantern work, spotlights, and projectors, micro-projection, photography, etc.

CURTIS LIGHTING COMPANY OF GREAT BRITAIN, LTD.—"Lighting from Concealed Sources," a leaflet illustrating the use of X-Ray reflectors in bracket and pedestal units, cornice lights, etc.

GENERAL ELECTRIC CO., LTD.—"Street Lighting Practice with Osira Lamps," a well illustrated list, containing views showing how objects are revealed on the roadway. Also "Osira Fluorescent Tubes for Decorative Illumination," a catalogue containing pleasing illustrations in colour, showing the variety of effects obtainable with these tubes.

SIEMENS ELECTRIC LAMP AND SUPPLIES, LTD.—List of Sieray Electric Discharge Lamps; includes particulars of the new 80-watt and 125-watt "QH" high-pressure mercury type lamps, and a variety of fittings for use with discharge lamps generally.



## Contracts Closed

THE BRITISH THOMSON-HOUSTON CO., LTD.

*Royal Mail Lines, Ltd.*—For the supply of Ma lamps for twelve months, commencing July 1937.

*City and County of Newcastle-on-Tyne.*—For supply of Mazda lamps for six months, c mencing July 1, 1937.

SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.

*Great Western Railway.*—A further contract the supply of Siemens electric lamps.

Printed by the ARGUS PRESS, LTD., Temple-avenue and Tudor-street, London, E.C.4, England.